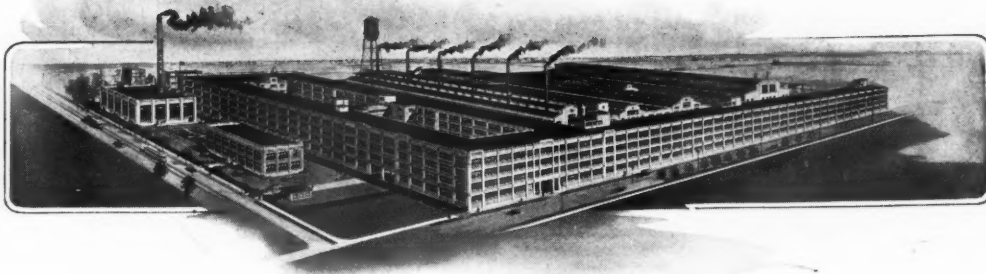


AUGUST 20, 1914

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MOTOR AGE





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DETROIT

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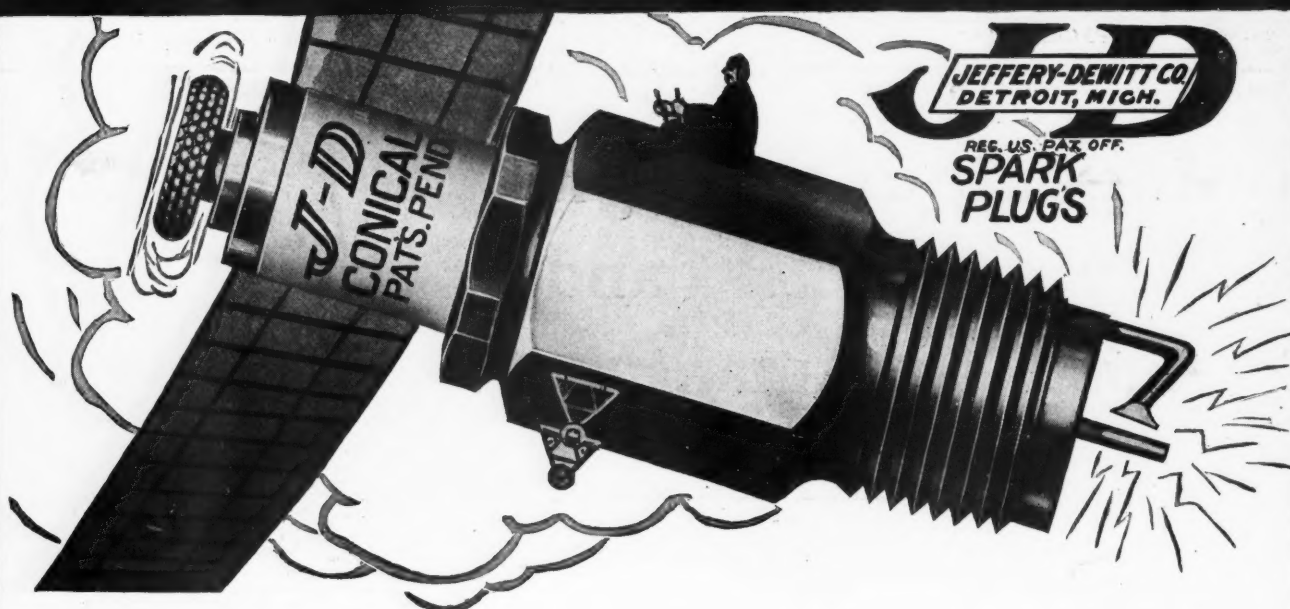
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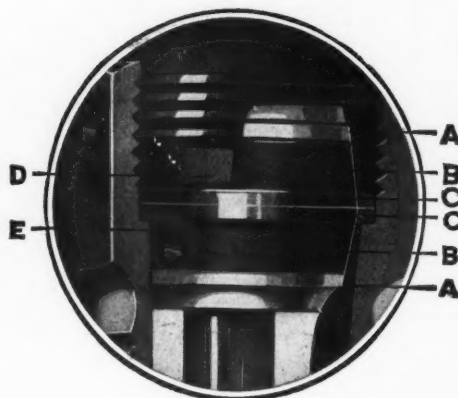
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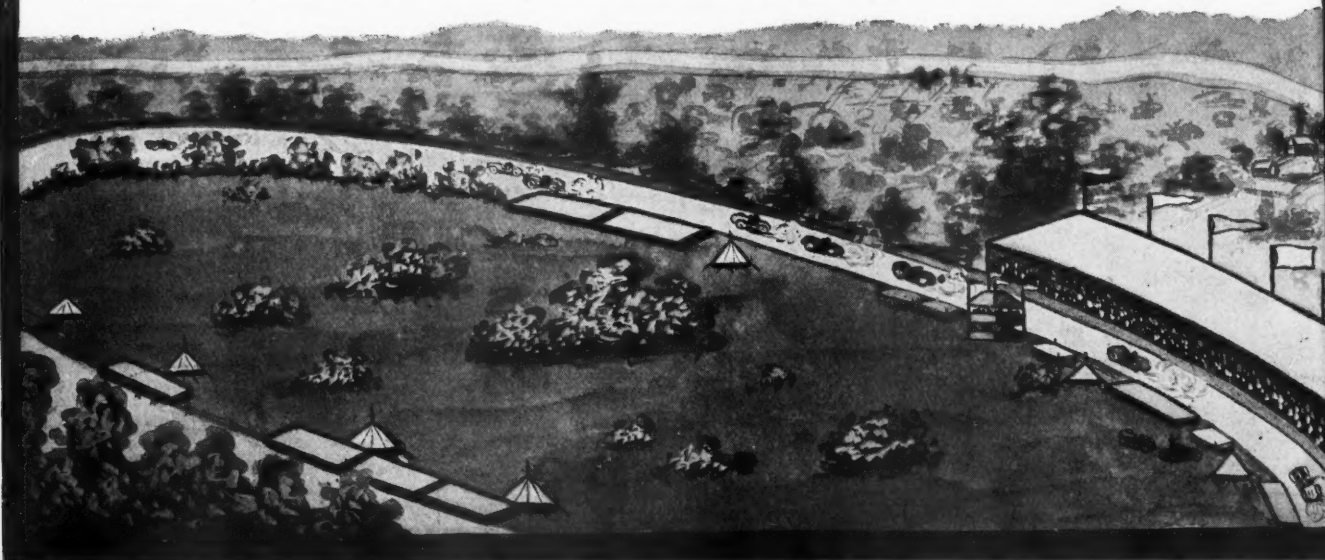
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MOTOR AGE



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Volume XXVI

August 20, 1914

No. 8

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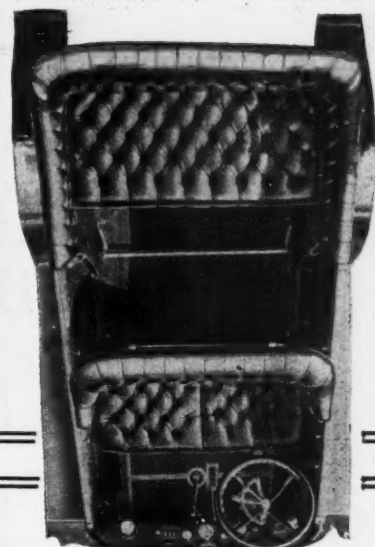
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MOTOR AGE

The 1915 Car

By Darwin S. Hatch

EDITOR'S Note—Announcements for 1915 made so far by American motor car manufacturers give a fairly good line on the trend for the new season. All makers have not announced as yet, but the sixty that have give motorists an idea of what the designers have been doing. We find that these engineers have decided to feature light fours and sixes, streamline bodies, one-man tops and more complete equipment. We also find that the tendency is to reduce prices and that the average price of the average four-cylinder is \$1,075 and of the average six, in touring car form, \$2,400. The average car, regardless of the number of cylinders, will sell at \$2,035, a reduction of \$600 from the 1914 figure.

LIGHT fours, light sixes, streamline bodies, one-man tops and more complete equipment throughout are to be the features of the 1915 American motor car market, if present indications are a criterion.

It is nearly as hazardous to attempt to predict just what the features of a new selling season will be by scrutiniz-

ing the announcements of half the makers at this early date as it is to foretell the results of an election from the reports of only a part of the total number of precincts.

Nevertheless, now that sixty makers have announced in part, at least, their plans for the coming season, one may assume with a reasonable degree of safety that the lead of these early birds will be followed for the most part by the others.

Of course, this will depend somewhat upon how the new cars already announced are received by the dealers and the motor-buying public.

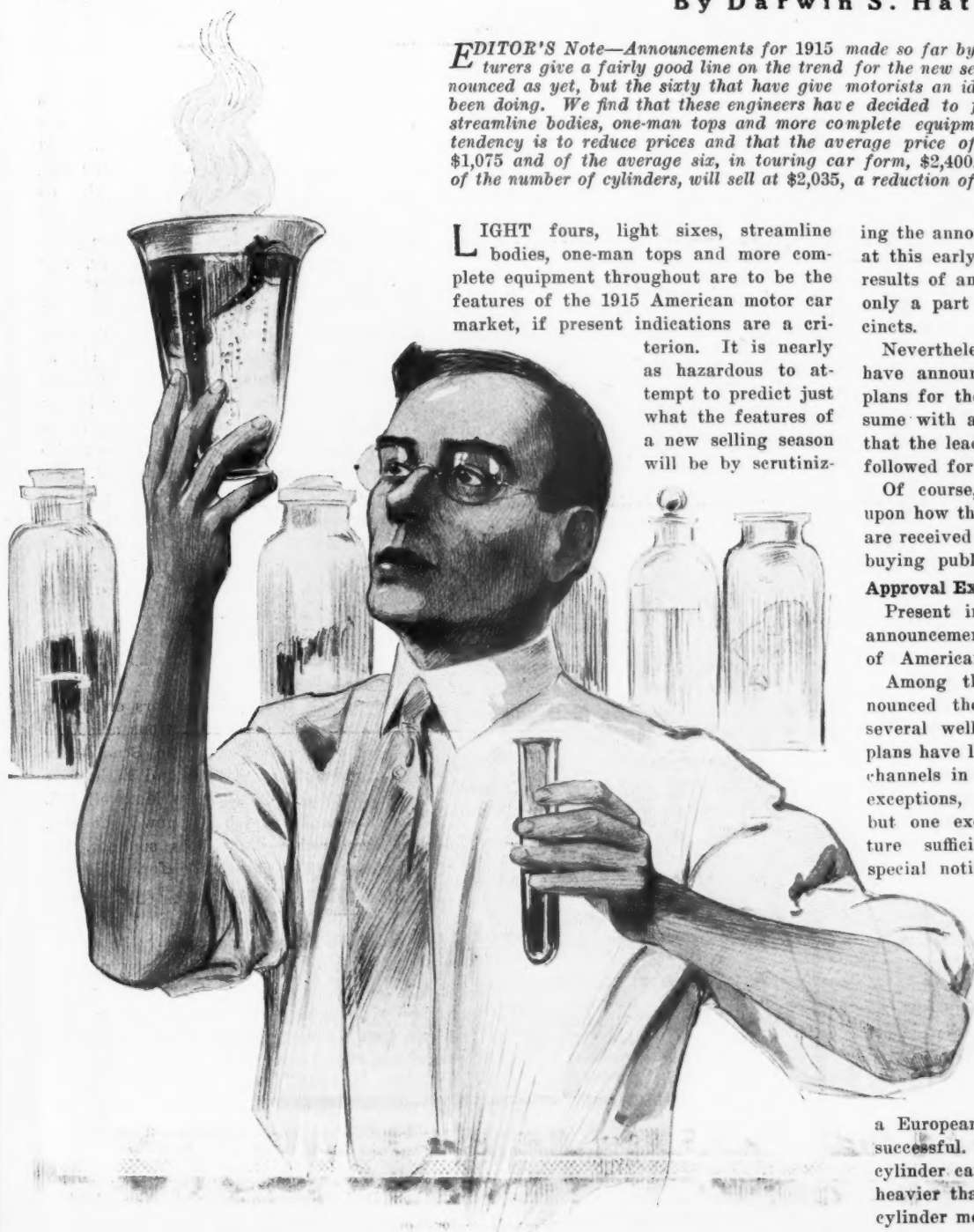
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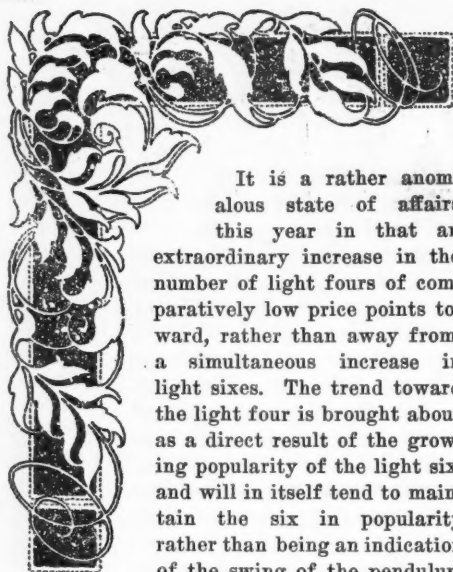
Present indications are that the new announcements meet with the approval of American buyers.

Among those who have not yet announced their plans publicly there are several well-known manufacturers whose plans have leaked out through the devious channels in the trade. With one or two exceptions, nothing radical is proposed, but one exception at least, is a departure sufficiently startling to deserve special notice at this time.

This is an eight-cylinder motor and is to be the product of an established manufacturer of high-grade fours. Two sets of four cylinders each, in V-shape, will be used, it is rumored. Eight cylinders will be a novelty on the American market, although

a European maker has found them very successful. It is rumored that the eight-cylinder car proposed will be no larger or heavier than the company's present four-cylinder model.





It is a rather anomalous state of affairs this year in that an extraordinary increase in the number of light fours of comparatively low price points toward, rather than away from, a simultaneous increase in light sixes. The trend toward the light four is brought about as a direct result of the growing popularity of the light six, and will in itself tend to maintain the six in popularity rather than being an indication of the swing of the pendulum

away from the six toward which it has been pointing for several years.

This can be shown by tracing the demand insofar as number of cylinders and weight are concerned for the past 5 or 6 years. Not so many years ago the popular demand from owners and dealers, as evidenced by the manufacturers' production, was for a four-cylinder car, and it seemed to be equally strong for heavy high-priced fours and for the cheaper lighter ones. Then the six was introduced and the dealer must have a six or a four; neither by the way was particularly light or extraordinarily cheap as compared with the present.

Demand for Light Sixes

More recently, within the past 2 years in fact, popular protest against heavy sixes, except for particularly high-grade cars, has resulted in the car manufacturers producing light sixes of lower price. This gave most of the manufacturers a light six-cylinder and a rather heavy four-cylinder without much difference between the two, either in price or weight, a state of affairs which left the manufacturer with the four on his hands, as a buyer who could afford to buy and run a heavy four generally felt he could pay a little bit more and have a six. If he did not care for a six, he usually saved money, on the first cost at least, by buying one of the lower-priced and lighter fours.

Consequently, in order to compete with these and give the dealer a complete line of models, the manufacturer has been forced to substitute for his heavy four a light four, or at least redesign the former for lower weight and lower cost, so that it could compete with the products of firms that specialized in light fours. Thus, we find that a percentage of the manufacturers this year will offer for the American market a light six-cylinder car and a smaller and lower-priced four.

Other manufacturers, such as Overland, and Paige, and so on, which heretofore

have specialized in light four-cylinder cars, are adding to their line for 1915, it is said, by introducing a light six. In only one or two instances have heavier models, or higher-priced cars, been added to the line of the manufacturer. The Pilot, perhaps, is the most prominent example. This concern has brought out a new six of large size for which power capabilities of 90 horsepower are claimed.

Reduction in Prices

Naturally with the reduction in weight of the cars as a whole there has come a reduction in price. As based on the eighty-five models of sixty-two manufacturers who have made their 1915 announcements, the average price of the car for next season will be only \$2,035, \$600 less than that of 1914 average car. The average four-cylinder car will cost \$1,075, which is \$200 less than it could be obtained for at the beginning of this year. Likewise, the average price of the six-cylinder has dropped from \$3,000 to \$2,700 in less than 12 months.

Based on the 1915 announcements up-to-date, the average four-cylinder car will have a block motor of 3.7 inches bore, and 4.65 inches stroke; its wheelbase will be 108½ inches, and tires 32 by 3½. The price of \$1,075, which is set as an average probably is a little higher than most of the cars will be bought for, because in figuring this, the prices of all the bodies offered are figured in and the inclosed bodies usually are considerably higher in price than the touring cars and roadsters which form the bulk of the sales.

The average six-cylinder car of 1915, on the same assumption, will have a 3.9 by 5.4 block motor, 129-inch wheelbase and 35 by 4½ inch tires. It will list at \$2,700, but based on the touring car models alone, the price will be \$2,400. One-man tops and power tire pumps will be standard equipment on most of these, and of course electric lighting and cranking will be stock on both fours and sixes for 1915.

Average Price of Cars

As for the 1915 cars in general, disregarding the number of cylinders, it will sell at \$2,035, \$600 less than the 1914 car. Its engine will be smaller than that of the 1914 car, being 3.85 bore and 5.13

stroke, as against the 4.12 by 5.28 engine of the present season; the wheelbase will remain the same, 121 inches; tires also will be the same size, 34 by 4. Based on the body model which forms the largest bulk of the sales, the price would be much lower than the general average where all the bodies are taken into consideration. On a basis of touring car and roadster bodies only, the 1915 car will sell at an average price of \$1,850, according to the present statistics.

Not in every case has the lower cost of the car taken shape in an actual reduction of the list price. In many instances it occurs in increased amount and quality of equipment. In some cases not only is there a reduction in the price but added or better equipment also is supplied. In two instances, that of the Chalmers and the Moline, the list price of the cars has been increased.

Changes on the Sixes

Among those who have announced changes on their six-cylinder cars are Overland which has added a new light six at \$1,475, the Studebaker is \$190 less, and the Buick has reduced the price on its six \$335. Jeffery has a new light six at \$1,650; Hudson has reduced the price \$200; the Franklin is \$150 lower, and the Peerless has a new light six at \$2,350. The Chandler has dropped \$190 and added equipment; Cole has dropped \$135 and also has a new little six at \$1,865. The Premier six has been reduced \$400; the Oakland six is \$100 lower; Paige, it is understood, is bringing out a new little six at \$1,400; the Abbott also has a new little six it is understood. Kissel has a new light six at \$2,350; a new Benham is a six at \$2,485; Pilot has a new big six at \$2,885; the new Singer is a six at \$2,500; the Monarch has a new one at \$1,400, and the Enger company has a new light six at \$1,495.

It is anticipated there will be other announcements of similar import made by other manufacturers later on.

Among the four-cylinder cars on which there have been price reductions are Ford which has dropped \$60, the Studebaker \$65, the Buick large four and little four reduced \$100 each, and the Maxwell \$55. The Oldsmobile, which is a new light four, has been reduced \$65 this summer, the Kisselkar \$400; the Cole four dropped \$260, the King reduced \$30, Regal reduced \$40, and the Grant \$70.

New Light Fours Appear

In addition to these there are a number of fours, all of the light type, which make their first appearance for the 1915 market. Among these is the Overland, which, it is rumored, is working on a new light four of the European high-speed type to sell at \$850; Mitchell has a new light four at \$1,250; Briscoe a new light four at from \$750 to \$900, depending upon equipment; Partin-Palmer at \$495; the Dodge company, not the Dodge Brothers, at \$495; The Allen is a new

VACUUM FUEL FEED	
Buick	Marmon
Cole	McFarlan
Jeffery	Oakland
Kisselkar	Republic
Lewis	Speedwell
WIRE WHEELS	
Briscoe	Fischer
Dille	Grant
Dodge	Singer
Saxon	Carnation

one at \$1,085. The new four-cylinder Dile is listed at \$495; the Wahl at \$890, and the Fischer at prices ranging from \$595 to \$845.

Most of those who have not reduced prices have added equipment, as have some which made a reduction in the list price as well. These include the Chandler, Lozier, Marmon, Metz, Stevens-Duryea, Overland, Winton, Oakland, Glide, Studebaker, McFarlan, Chalmers, Saxon, Detroit, and Cartercar.

One or two concerns have brought out or modified their light fours and have discontinued a larger four-cylinder model. Among these are the Cartercar and Oakland. It is interesting to note that the average reduction of all the continued models is \$58 per car, and the average reduction on all the continued models on which there have been reductions is \$150.

The Single Chassis Theory

It is quite significant that of the new makes of cars announced to date all are built on the single-chassis principle. This is in line with the trend among the older makers toward concentration on but one or two chassis, thus making for lower production cost. The Cartercar, for instance, has dropped all but one of its original models and concentrates upon a single four-cylinder chassis. Franklin with its six took this step a year ago.

What will give the chief index as to the trend in the matter of prices, is the fact that of the nine new makes of cars which so far have made their debut for the 1915 season, seven are four-cylinders and only two are sixes, and of the four-cylinder cars not one is listed at over \$900. These include the Briscoe at \$750, the Dile at \$475, the Dodge company's product at \$495, Fischer at \$595, the Hercules at \$495, Sterling at \$650, and the Wahl at \$890.

All of these, by the way, are typical light fours, the largest engine being that of the Wahl which is $3\frac{3}{4}$ by $4\frac{1}{2}$. This car also is the heaviest among the list of new fours and it tips the scales at only 2,250. The smallest engine announced so far is that of the Dile which is $2\frac{5}{8}$ by 4, with the Fischer a close second at $2\frac{3}{4}$ by 4.

The two sixes, announced by new makers this year, are the Benham and the Singer, neither of which is listed at over \$2,500.

There are a number of mechanical features about the cars so far announced for the 1915 season which show a change from present practice. Among these may be mentioned the very great increase in the fitting of one-man tops as stock equipment, at least twenty-five, or nearly one-half of those announced so far, will be equipped with these easily operated tops.

Another feature is the increased popularity of the pointed or curved radiator. The V-type of radiator will be found this



year on the Pathfinder and Oakland as it was on 1914 cars, and the Singer and Wahl also have taken it up. Curved radiators likewise will be more in evidence. The Grant had this type of cooler in the 1914 cars and continued it for the new season. Apperson, Detroit, Maxwell and Fischer will have curved radiators for the first time.

Municipal restrictions of glaring headlights have resulted in the majority of manufacturers fitting some method of dimming the driving lights. In most instances this has taken the form of the use of two sets of bulbs in the headlight, and doing away with side lights. One set of bulbs in such cases is in the proper focus and size for driving searchlight while the other is smaller and placed out of focus for city use.

The Ignition Question

The ignition question seems to be in a somewhat unsettled state at the moment, as there has been more change in the ignition equipment this year than has occurred in a number of years. This state of affairs is due to the fact that with the ever-present source of electric energy provided by the generator and storage battery of the electric cranking and lighting systems, many of the manufacturers have questioned the need of the added expense of the magneto.

Heretofore, the magneto had the field almost undisputed on account of the fact that it automatically increased the heat of the spark as the engine speeded up, and in some instances advanced the spark with increase in engine speed. Within the past year or two there have been developed battery distributors which automatically advance and retard the spark so that it occurs at the proper time no matter how great the variation of engine speed. This to a certain extent, takes the wind out of the sails of the magneto in the minds of some makers. It accounts for the fact that of the new models announced for 1915 several discarded the magneto and are using the current supplied by the electric lighting and cranking system through a distributor and coil with which the automatic advance feature is incorporated. To offset this, however, two concerns at least are fitting magnetos for the first time.

Wire wheels as a feature of stock equipment have not shown the rapid increase in popularity that was expected a year ago. As so far announced, only six manufacturers will make this type of wheels stock equipment. This includes the Briscoe, Grant, the Dodge company car, the Singer, Fischer, Dile, Saxon and Carnation. This would be expected of the latter in particular as it is a narrow-tread car that verges on the cyclecar field.

Of all the features of mechanical equipment, the one that has taken hold most rapidly is the new combination of vacuum and gravity fuel feed system by which the fuel may be carried in a tank at the rear of the car, but no pressure system need be installed to get it to the carburetor. This system has taken hold only within the past 6 months but even in this short space of time ten different car makers have adopted it for 1915.

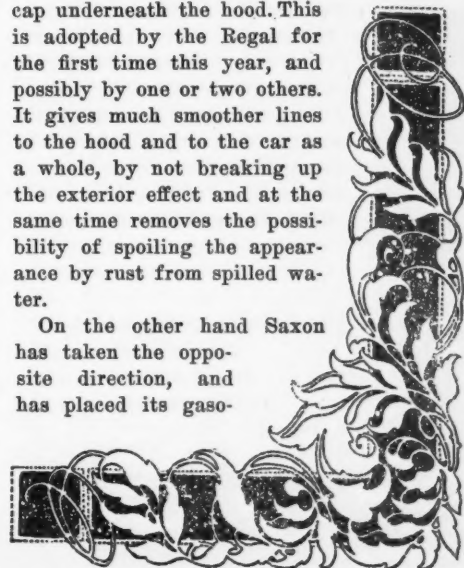
Cantilever Springs Gaining

Cantilever springs have shown a slight but healthy gain in popularity. At the present time Buick, Jeffery, Pathfinder and National have definitely announced that they will employ this type of rear suspension. King, Saxon and Carnation also use them. In addition, it is to be expected that such cars as the Willys-Knight and probably the new Overland six, as well as a number of others, will have this feature when their details are announced.

Right drive has received another blow in the announcements of the 1915 cars. Such steadfast supporters of the right-hand location of the steering wheel as Hupmobile and Overland have switched to the left side of the car as has the Stevens-Duryea, while the Locomobile and Herff-Brooks have definitely abandoned their right-drive models and in the future will market nothing but cars with drive on the left side. All of these cars had center control heretofore and the change did not incur any great chassis alteration.

A unique feature in some of the 1915 cars is the hiding of the radiator filler cap underneath the hood. This is adopted by the Regal for the first time this year, and possibly by one or two others. It gives much smoother lines to the hood and to the car as a whole, by not breaking up the exterior effect and at the same time removes the possibility of spoiling the appearance by rust from spilled water.

On the other hand Saxon has taken the opposite direction, and has placed its gaso-



line filler pipe on the outside of the cowl instead of having it under the hood as was its 1914 practice. This for better accessibility.

Though worm-drive rear axles are not seen on many more of the new models than there were on the 1914 cars, a new type of final gear reduction is employed in three instances among the gasoline cars, and in one instance with the electric. This has the quality of silence and even wear that is one of the advantages of the worm drive but is of less expensive construction. Both the Franklin and Moline have followed the lead of the Packard in adopting a combination shape of spiral and bevel gear with which Packard and Moline call the spiral-bevel drive and the Franklin calls the skew-bevel. The electric which has this feature is the Buffalo.

When it comes to body construction there has been a great deal of improvement in appearance and in comfort. In nearly every case, body lines have been vastly bettered. Instead of the pronounced curves that were found to a certain extent in the 1914 bodies, straight lines have become the style and instead of having the upholstery extend above the sides of the body it has been carried below so that a side view of the car shows nothing but the paneled edge which re-

minds the motoring critics of the cockpit of a fast boat.

Oakland and National are two cars in which this particular feature has been brought out to an unusual extent. Running boards, of course, are clean, even to a greater extent than in the 1914 cars. However, there are not so many instances in which the storage battery is carried under the frame as in the present models. The difficult problem of getting the battery out of sight and still having it accessible has been solved in many instances by hiding it under a cover in the apron. Tires are carried always at the back and in general are slightly larger and more usually non-skid for the rear as stock equipment.

Power tire pumps are one of the chief ways in which the equipment has been increased, and others in the fitting of extension lamps, cigar lighters, and similar minor comforts about the car.

Single-compartment bodies have made their appearance in the touring car field. Last year these bodies were frequent among the inclosed cars but the type now has stepped over into the open one. By single-compartment touring bodies is meant the separation of the front seats so that there is a passage-way between them that interchange of seats may be made between the front and rear without

leaving the car. Pierce-Arrow, Packard, Kissel-car and Chalmers have taken up this type.

Kisselkar has taken advantage of this arrangement by doing away with one pair of doors in the touring car, so that there are only two doors in its five and six-passenger bodies. The Kisselkar also has utilized its single-compartment two-door body in featuring an all-weather vehicle, which is provided by applying to the touring car a sedan top instead of the folding one for winter use. This extra top is furnished at a slight added cost.

In the field of electrics, incomplete returns show that the dual-drive type is gaining in favor. By this arrangement either front-seat or rear-seat passengers can control and drive the car. One electric, the Buffalo, has arranged for the driver to be seated exactly in the center of the car. Greater touring radius per car and consequently cheaper operation have been obtained by improvements in batteries, new special tires of high efficiency, and improvements in the running gear by which friction and therefore current consumption is less. The Buffalo has arranged its motor so that on hills it acts as a brake, and, running as a generator on down grades, puts back into the batter some of the energy which has been expended.

Leading Features of 1915 Cars Already Announced

Motor Sizes, Price, Improvements, Etc.

ALLEN—Allen Motor Co., Fostoria, O.—New light four added, 3½ by 5 inches; wheelbase 110 inches and weight 2100 pounds; to sell at \$1085.

Apperson—Apperson Bros. Automobile Co., Kokomo, Ind.—New four at \$1485; new light six at \$1785 and larger six at \$2200; low weight and streamline bodies, curved front radiator, one-man top and dimmers are among the features.

Benham—Benham Mfg. Co., Detroit, Mich.—A new car brought out in the spring; six cylinders, 3½ by 5½; assembled from standard units; \$2485.

Briscoe—Briscoe Motor Co., Jackson, Mich.—New light car, four-cylinder 3½ by 5½, wheelbase 108, floating axle, Price \$750; \$900 with electric lighting, top and boot, etc.; steering position optional.

Buick—Buick Motor Co., Flint, Mich.—Two fours and a six continued with refinements; bodies redesigned with clean running boards and streamline; six reduced \$335, now \$1650; big four touring reduced \$100, now

\$1235, little four touring reduced \$100, now \$950; six suspension changed by use of cantilever springs; vacuum fuel used on the fours.

Cartercar—Cartercar Co., Pontiac, Mich.—Concentrating on light four, 3½ by 5, friction drive; dropping larger four; price remains at \$1250; new gear ratio 4 to 1; new streamline body; dimmers on headlights.

Case—J. I. Case Threshing Machine Co., Racine, Wis.—Three chassis models continued with minor refinements; model 40 dropped \$500, now \$1,800; model 35 dropped \$250, now \$1,600; model 25 increased \$100, now \$1,350; upon all discount of 5 per cent for cash offered; features of unusually complete equipment continued, including spare tires and tubes, tire chains, spark plug, tire pump, etc.

Chalmers—Chalmers Motor Co., Detroit, Mich.—Two sixes continued with refinements; increased prices, more complete equipment, body refinements; master six price increased \$125 to \$2400; light six increased \$60 to \$1850; fuel feed changed from pressure to combination pressure and gravity via auxiliary tank on dash; slight change in gear reduction; tires on light six increased to 34 by 4½; seven-passenger body is two-door single-compartment type with passage-way between front seat.

Chandler—Chandler Motor Car Co., Cleveland, O.—Single model, six-cylinder; price dropped \$190, now \$1595; power increased by lighter parts; headlight dimmers and spare tire added to equipment.

Cole—Cole Motor Car Co., Indianapolis, Ind.—Three models—a big six continued with drop of \$135, now \$2465; little six, new, at \$1865, and four made lighter and \$260 less in price, now \$1665; vacuum fuel feed added to all models.

Detroit—Briggs Detroit Co., Detroit,

Mich.—An 8-inch increase in wheelbase and complete redesign of the body features this four; price remains \$1,050; weight remains at 2,300 pounds; fuel tank under cowl and carburetor raised 4 inches; cranking and lighting system has been changed; rounded radiator with smooth streamline body employed; a muffler cut-out provided as stock as is oil level warning light; running boards are clean; one-man top as stock.

Dille—Dille Motor Car Co., Reading, Pa.—New light car at \$495, four-cylinder 2½ by 4, 46-inch tread and 96-inch wheelbase; roadster only.

Dodge—Dodge Motor Car Co., Detroit, Mich. (Not Dodge Bros.)—New light four 3 11-16 by 4; roadster body; \$495; with electric lighting and cranking, \$100 extra.

Empire—Empire Automobile Co., Indianapolis, Ind.—Single light four chassis in two types, one a continuation of the 1914 car with only minor chassis changes at a reduction of \$50 making it \$850; a new model electrically started and lighted touring car at \$975.

Enger—Enger Motor Car Co., Cincinnati, O.—New light six of 2,800 pounds and 121 inches wheelbase; motor 3½ by 5; ignition battery and distributor with automatic advance; six-passenger streamline body \$1,495.

Fischer—C. J. Fischer Co., Detroit, Mich.—New light four, 2½ by 4, 104-inch wheelbase; five body styles from \$595 to \$845 with electric lighting and cranking; wire wheels \$30 extra; one-man top stock.

Ford—Ford Motor Co., Detroit, Mich.—Reduction of \$60 in price is only change announced in light four; new price \$440 for runabout, \$490 for touring car and \$690 on town car; further reduction from \$40 to \$60 promised dependent upon production of 300,000 prior to August, 1915.



Franklin—H. H. Franklin Co., Syracuse, N. Y.—Chief change is reduction of \$150 on the price, making it \$2150; skew-bevel gearing substituted for bevel gear reduction at rear axle; dash oil adjustments.

Gilde—Bartholomew Co., Peoria, Ill.—Thirty horsepower four continued with refinements; price remains at \$1,195; body lines improved; disk clutch replaces cone; suit case space under front seat and new brake connections.

Grant—Grant Motor Co., Findlay, O.—Light four roadster; price reduced \$70, now \$425 and \$505 with electric lighting and cranking; bull-nose radiator; wire wheels.

Haynes—Haynes Automobile Co., Kokomo, Ind.—New light six at \$1,485; larger six continued with price reduced \$450 making it now \$2,250; four-cylinder model continued with reduction of \$325, making it now \$1,660; light six has new block motor which develops 55 horsepower; one-man top and power tire pump among the equipment.

Hercules—Hercules Motor Car Co., New Albany, Ind.—A new car, four-cylinder 3½ by 4, 100-inch wheelbase; two-speed selective gearset; ignition by battery and distributor with automatic spark advance; price \$495 with electric generator and \$550 with starter.

Herff-Brooks—Herff-Brooks Corp., Indianapolis, Ind.—Four and six prices remain at \$1,100 and \$1,375; bodies completely rebuilt to streamline form; extra seat for sixth person in five-passenger cars; steering wheel folds back to give easier entrance to the front seat; left drive adopted exclusively; wheelbase of four lengthened 2 inches, now 118; bore increased ⅜ inch, now 4½; one-man top added.

Hudson—Hudson Motor Car Co., Detroit, Mich.—Light six continued with reduction of \$200; new price \$1,550; engine block cast instead of in threes; automatic spark advance added, hollow driving shaft.

Hupmobile—Hupp Motor Car Co., Detroit, Mich.—Car entirely re-designed; electric cranking and lighting stock; price same as 1914 Model H when electrically cranked; larger car, 300 pounds heavier; bore increased ⅜ inch, now 3½ by 5½; wheelbase increased 13 inches, now 119 inches; left drive, center control instead of right drive; rear suspension changed from platform to semi-elliptic underslung; larger carburetor employed; ignition, battery and distributor system with automatic spark advance; new streamline bodies with new radiator to conform with latter; tires increased 1 inch, now 34 by 4; price remains at \$1,200; one-man top and dimmer added.

Jeffery—Thos. B. Jeffery Co., Kenosha, Wis.—New light six with worm-driven rear axle, leather universal and cantilever springs; block motor 3 by 5 inches, vacuum fuel feed, streamline bodies, one-man top, power pump and dimmers at \$1,650; older cars unchanged.

Kieselkar—Kissel Motor Car Co., Hartford, Wis.—Two new chassis and light four and a light six, the former at \$1,450, \$400 less than the price of the older four. The new six is quoted at \$2,350. The feature is the two-door single-compartment body with individual forward seats, and the sedan top to convert tourist into limousine. Vacuum fuel feed is used.

Lewis—L. P. C. Motor Co., Racine, Wis.—Single six-cylinder chassis with minor refinements and improved body lines; price remains at \$1,600; vacuum fuel feed adopted.

Locomobile—Locomobile Co. of America, Bridgeport, Conn.—Adoption of left drive exclusively and standard tread and button starting on the two six-cylinder models are the chief changes; prices remain the same, \$5,100 for the 48 and \$4,400 for the 38.

Lozier—Lozier Motor Co., Detroit, Mich.—New light six with ½ inch longer stroke; longer wheelbase. Price remains at \$3,250; cylinders now are 3½ by 6; wheelbase now 132 inches; disappearing extra seats.

Lyons-Knight—Lyons Atlas Co., Indianapolis, Ind.—Continues its single Knight-engined worm-drive chassis unchanged, except for minor refinement and increased equipment; price remains at \$2,900; this company makes its own motor which is featured by the sleeve valves and the covering of the cylinder heads to keep out dirt and moisture, and to protect the spark plugs.

Moline—Moline Automobile Co., Moline, Ill.—Single four-cylinder Knight-engined chassis continued with refinements; chief change is adoption of spiral-bevel final drive reduction; control levers moved back closer to the front seat to give unobstructed passage; body of touring car unchanged; price increased \$100, now \$2,500; roadster, sedan and limousine added.

McFarlan—McFarlan Motor Car Co., Connersville, Ind.—Single six chassis continued with increases of 4 inches in wheelbase making it 132; weight reduced 300 pounds; vacuum fuel feed is employed; new type of tire carrier and new arrangement of levers; option of either McFarlan pneumatic system or electric cranking system offered; gearshift and brake lever between the front seat cushions; price remains at \$2,590; another model 4½ by 6 inches continued at \$2,900.

Marmon—Nurdyke & Marmon, Indianapolis, Ind.—Six-cylinder Model 41 a refinement of 1914 car, the price remaining at \$3,250. Clean runningboards and streamline bodies are the notable improvements, and a one-man top and cord tires are made stock equipment. Vacuum fuel feed is used.

Maxwell—Maxwell Motor Co., Detroit, Mich.—Light four and a light six; six for 1915 not announced at this time; light four price reduced \$55, now \$695 with \$55 extra for electric cranking and lighting; new streamline body, rounded radiator and better springing are features; weight with electrical equipment, 1,850 pounds.

Metz—Metz Co., Waltham, Mass.—Four-cylinder roadster continued at \$495; wheelbase increased 6 inches, now 96; friction drive still a feature; body has been made streamline and more roomy.

Mitchell—Mitchell-Lewis Motor Co., Racine, Wis.—New light four at \$1,250; older models continued with many changes; light four cylinders 4 by 5½; one-man top, ignition lock, headlight dimmer and magnetic inspection lamp features of equipment.

Monarch—Monarch Motor Car Co., Detroit, Mich.—A new six-cylinder car at \$1,400 with a 3½ by 5 Continental engine; speedometer driven by steel belt from propeller shaft; four is continued.

Moon—Moon Motor Car Co., St. Louis, Mo.—Two new cars, a four and a light six of practically the same design; four price, \$1,350; has 3½ by 5 inch motor; six sells for \$1,575 and has a 3½ by 5-inch motor. Model 6-50 carried over with minor improvements; all Moons now have Continental motors and new type of streamline body.

Oakland—Oakland Motor Car Co., Pontiac, Mich.—Two chassis continued with refinements; price of six reduced \$100 to \$1,685; 1914 larger four discontinued; small four re-designed; price remains \$1,200; four motor of same size, 3½ by 5, but is high-speed type; vacuum fuel feed; ignition battery and distributor with automatic spark advance; Hotchkiss final drive adopted; body lines very much improved.

Oldsmobile—Olds Motor Works, Lansing, Mich.—New little four, 3½ by 5 with inclosed overhead valves, brought out in the spring at \$1,350 and the price reduced \$65 in July to \$1,285; running gear design is like that of six, which is continued.

Overland—Willys-Overland Co., Toledo, O.—Left drive, streamline bodies, and centralization of lighting, horn and other buttons on the steering post are chief changes on the four. Starting has been slightly rearranged and electric equipment has been made stock, though the price remains the

same as the 1914 figure, when the electric equipment was added. A six-cylinder, seven-passenger model is added at \$1,475; long-stroke engine; new light four to come later; reports of both new cars unofficial.

Packard—Packard Motor Car Co., Detroit, Mich.—Two sixes practically unchanged; slight changes in carburetor, gearset and oiling systems. The head lamps have been altered so there are two lamps in one each with its own reflector; side lamps are retained; prices remain the same, being \$3,750 for the 3-38 and \$4,750 for the 5-48.

Partin-Palmer—Partin Mfg. Co., Chicago—New light four 2½ by 4; 96-inch wheelbase; roadster body; \$495. Electric lighting stock; electric cranking \$75 extra.

Pathfinder—Motor Car Mfg. Co., Indianapolis, Ind.—Two sixes with little mechanical changes; pointed radiator and cantilever rear springs; prices remain the same, \$2,750 for Leatherstocking and \$2,222 for Daniel Boone.

Pierce-Arrow—Pierce-Arrow Motor Car Co., Buffalo, N. Y.—Three sixes, 66, 48 and 38; no changes in prices or chassis; bodies re-designed and lowered; starting by single push button on dash.

Pilot—Pilot Car Sales Co., Richmond, Ind.—Four and a small six continue; new six model 75 is 4½ by 6 with a factory rating of 90 brake horsepower; motometer is stock equipment; price \$2,885; the four is \$2,500 and the other six, model 60, is \$2,785, the same as 1914.

Premier—Premier Motor Mfg. Co., Indianapolis, Ind.—No change in T-head six except springs; semi-elliptic rear springs instead of three-quarter; price reduced \$400, now \$2,385.

Pullman—Pullman Motor Car Co., York, Pa.—Single six-cylinder model, price remaining at \$2,500 with Vulcan electric gearshift and \$150 less without this equipment; wheelbase lengthened slightly; bodies have been made more roomy.

Regal—Regal Motor Car Co., Detroit, Mich.—Underslung frame discontinued and price lowered \$40, new price \$1,085; stroke lengthened 1 inch, making cylinders 3½ by 5; motor made lighter; streamlined body and clean running boards; radiator filler cap under hood; floating instead of semi-floating axle; battery distributor ignition with automatic advance; no spark or throttle levers on steering column.

Republic—Republic Motor Car Co., Hamilton, O.—Refinement of body lines, improved clutch and vacuum gasoline feed are chief changes in the single six-cylinder car; price remains at \$2,950.

Saxon—Saxon Motor Co., Detroit, Mich.—Light four with detailed refinements; price remains at \$395; larger body of streamline form, complete running boards and better upholstery provided; three-hinged bonnet replaces one-piece design; gasoline tank filler cap in cowl instead of under bonnet; headlights removed from side to front; carburetor, brake and rear axle improvements; ignition by battery and distributor with automatic spark advance.

Singer—Singer Motor Co., Detroit, Mich.—A new car; six cylinder, T-head engine, 4 by



5½; V-radiator; wire wheels; one-man top; \$2,500.

Speedwell—Speedwell Motor Car Co., Dayton, O.—Continuation of the rotary valve motor at \$2,850 the feature; new cranking, lighting and ignition system and vacuum fuel feed; body design is new; power tire pump and one-man top stock.

Sterling—Sterling Motor Car Co., Brocton, Mass.—New car, a light four weighing 1,250 pounds at \$650 with electric lights.

Stevens-Duryea—Stevens-Duryea Co., Chickopee Falls, Mass.—Two sixes continued with some changes; bore increased 1-16-inch; right drive discarded in favor of left; electric starting now stock equipment; feature is new roadster body with disappearing top at \$4,550.

Pierce-Arrow—Pierce-Arrow Motor Car Co., Buffalo, N. Y.—Offering fifty-four different body types on its three six-cylinder chassis; latter are continued with but minor changes; bodies and equipment have been changed, although prices remain the same at \$4,300 for the small six, \$4,900 for the medium six and \$5,900 for the large six; new lines of the body have been given by the only primary change in the chassis, which is a drop in the frame; divided front seats in open bodies giving a single compartment car is a feature as are the electric lights provided in their backs; one-man top, called Solitaire employed.

Studebaker—Studebaker Corp., Detroit, Mich.—Light six and light four; lighter, roomier, and more powerful than formerly at a reduction of \$65 in the case of the four and \$190 in the case of the six, making the new prices \$985 for the four and \$190 in the case of the six, making the new prices \$985 for the four and \$1,385 for the six; cylinders remain at 3¼ by 5 inches, but power increased by lightening reciprocating parts and altering manifold design; carburetor waterjacketed; one-man top adopted and control linkage altered; four weighs 2,500 pounds and six 3,000.

Stutz—Stutz Motor Car Co., Indianapolis, Ind.—A new small four model HCF at \$1,475; Bosch magneto adopted, increased equipment; no change is announced on other models.

Vellie—Vellie Motor Vehicle Co., Moline, Ill.—Light four re-designed with larger motor and 3-inch increase in wheelbase; wheelbase now 116 inches; price \$1,500; new light six model dropped \$385, now \$2,015; tires increased to 37 by 4½ inches, non-skid in the rear; large four dropped \$250, now \$1,750; increased equipment on all, including power tire pump and double headlight bulbs.

Wahl—Wahl Motor Co., Detroit, Mich.—New light four, 3¼ by 4½ at \$890; electric lighting and cranking, \$125 extra; battery distributor ignition with automatic advance;

one-man top and demountable rims stock equipment; V-type radiator; weight 2,250 pounds.

Winton—Winton Motor Car Co., Cleveland, O.—Single six cylinder chassis; little change mechanically; bodies re-designed; spring suspension improved and electric cranking offered as an option in place of Winton air cranking; radiator enlarged; one-man top and oil cushion inserts stock equipment; price remains at \$3,250 for the two and four-passenger cars.

ELECTRIC VEHICLES

Buffalo—Buffalo Electric Vehicle Co., Buffalo, N. Y.—Central control system in which steering column and brake pedals are in the center; cantilever springs at the rear; motor regulation by lever and pedal; mileage per battery charge extended by rearrangement of motor; many body refinements; price of coupe \$3,200.

Waverley Electric—Waverley Co., Indianapolis, Ind.—Minor chassis refinements but numerous body changes in model 109; rounded corners and enlarged window space, sashless windows and lower mounting of the battery boxes are chief changes.

Woods—Woods Motor Vehicle Co., Chicago—Worm drive, dual control and concealed springs; increased battery capacity and higher prices; price of dual control brougham, \$3,250.

Motor Exports of the Past Year Largest on Record

Total Shipments Amount to \$4,136,565

WASHINGTON, D. C., Aug. 15—The secretary of commerce today announced that exports of motor cars from the United States in the fiscal year ended June 30, 1914, were the largest on record. Their total, including shipments to Alaska, Hawaii and Porto Rico, amounted to \$40,136,565 as against \$39,325,000 in 1913, the former high-record year. The year's total included 30,136 complete cars, valued at \$27,797,642; tires, \$4,159,454; motor car engines, \$1,391,893, and miscellaneous parts, not specified, \$6,787,575.

With the sole exception of 1908, every year during the past decade has shown an advance in the value of American motor cars sold to foreign countries. In the fiscal year 1904, according to the bureau of statistics, the value of motor cars exported was \$1,895,605; in 1909, \$5,387,021, and in 1914, exclusive of parts and shipments to our own non-contiguous territories, \$26,574,574, having quintupled in 5 years and increased thirteen-fold in a decade.

Europe bought nearly one-half of our entire sales of motor cars to foreign countries last year, although some shipments there are for reshipment to other parts of the world. To the United Kingdom the exports amounted to 7,222 cars, valued at \$5,853,127; to Germany, 1,435, valued at \$1,059,249; to France, 1,429, valued at \$224,130; and to other countries of Europe, 3,271, valued at \$2,580,428. Canada and Australia also are important markets, the former having taken 4,624 cars, valued at \$5,919,776 and the latter, including other British Oceania, 4,244, valued at \$3,695,595. To South America,

as a whole, we sold last year 1,985 motor cars, valued at \$1,939,212, and to Mexico, 167, valued at \$256,675.

The growth in exports of motor cars has been accomplished by a corresponding decline in imports of like articles, the total having fallen from 1,624, valued at \$2,905,391 in 1909, to 300 cars valued at \$620,493 in 1914, a new low record for the decade. Of the year's imports, 134 were from France, forty from the United Kingdom, fifty-five from Italy and twenty-one from Germany.

INJUNCTION MODIFIED

Detroit, Mich., Aug. 17—The injunction which the Wallace Shock Absorber Sales Co. of this city filed against the Bresler-Wallace Sales Co., preventing it from selling Wallace shock absorbers has been modified by the court, which holds that the Bresler-Wallace Sales Co. cannot sell other than Wallace shock absorbers and call them the Wallace. Therefore, the Bresler people are calling the open style shock absorbers the 4rd shock absorbers model A, and the inclosed style model B.

HAYS GETS MICHIGAN PLANT

Kalamazoo, Mich., Aug. 17—Judge Sessions of the federal court, Grand Rapids, Mich., has decided that the bid of \$45,000 made by Former Mayor Charles B. Hays, of this city, for the plant of the bankrupt Michigan Buggy Co., should be confirmed, and thus the sale of that property which has given way to many bids which had been refused because they had not reached the sum estimated as minimum by the court is a matter of past history. Accord-

ing to estimates the plant really is worth about \$250,000. Mr. Hays bought the plant purely as an investment and does not intend to enter the manufacturing field, it is said.

PACKARD ADDS TO ITS PATENTS

Detroit, Mich., Aug. 17—In accordance with its policy of continually strengthening its patent position, the Packard Motor Car Co. has followed up its purchase of several years ago of the Cowles motor vehicle patent applications and now is having issued to it a number of divisional patents based upon the original patent No. 1,050,810, the application for which was filed on Sept. 6, 1901.

The latest of these to issue is that relating to the truss rod construction, taking into consideration torsion tube design and trunnion springs. This is dated August 11, 1914, and its patent number is 1,107,042. There are two other of these divisional patents which have been issued, and more to be granted in the near future. Still others are likely to be held up at the patent office for a few months longer in accordance with usual patent office procedure. The other two issued are: the main patent No. 1,050,810, dated January 21, 1913, and relating principally to an improved steering wheel hub and means for mounting the same; and 1,103,567, dated July 14, 1914, and relating to the running gear and steering mechanism.

It must be understood that all of these divisional patents are based upon the one main patent applied for on September 6, 1901, and granted under patent No. 1,050,810. The patent office permits of

Motor Industry in England Stagnant Because of the European War

By J. S. Critchley, President Institution of Automobile Engineers

LONDON, Aug. 18—Special cablegram—The motor trade in Europe, except in vehicles for war purposes, is completely stagnant. It is impossible to state what continental factories are actually operating, but it is known that very many are closed, due to being in the war area or all labor drawn to the army. The F. N. works at Liege are shut; also all other plants in that area.

The makers of pleasure cars are simply doing as little as possible and it is doubtful if any progress will be attempted in connection with next season's models for some time. Under ordinary conditions the trade always is slack at this period and no attempt will be made to get in supplies until the outlook is more settled. No component parts can be brought into this country from the countries at war, but this only affects makers of commercial vehicles which are, of course, in demand. Supplies of most component parts can, however, be supplied by British firms with the exception of cast steel wheels and magnetos.

To sum up the situation, the only purchasers of motor cars are the various war departments, which chiefly want heavy vehicles. Other makers therefore are practically closing down and not troubling about supplies. There is a demand for commercial vehicles only to replace those taken for war purposes and all stocks are depleted and outputs sold for long periods ahead.

such divisions under main patents, and the Packard company is taking advantage of this ruling for its strengthening.

The patent department of the Packard company, of which Milton Tibbetts, Packard patent counsel is the head, attaches considerable significance to these Cowles patents for obvious reasons. The divisional patents growing out of the broad claims of the main original patent, relate to such features as an improvement in rear axle construction, interchangeable wheels, spring construction, frame construction, body design, steering connections, rear signal device, mounting of the motor, shock absorbers, and so on.

CONTINENTAL NOT AFFECTED BY WAR

Detroit, Mich., Aug. 10—The Continental Motor Mfg. Co. denies there will be any letup in the activities of the concern because of the European war, because of difficulty in obtaining certain alloys and high-grade metals of which the concern is one of the most expensive users in the world. In fact, the outlook for the business is such that the extensive additions to the plant started some time ago will be pushed along as much as possible. These additions consist in wings to the testing and machine shops, and a large amount of new machinery is being added to the general equipment. From now on the Continental company will also make all the metal stampings used in its various models of motors.

NEW JERSEY REPORTS ON TAGS

Trenton, N. J., Aug. 13—Total collections of the state motor vehicle department from January 1 to July 31, have amounted to \$734,573.31, as against a total of \$589,008.13 for the same period last year, or an increase of \$145,565.18. For the whole of 1913 only \$661,446.31 was collected. The 7 months of this year, therefore, shows an increase of \$73,127 over the whole of 1913. For the month of July, this year, \$53,175.26 was collected, compared with \$48,510.85 for July last year. The number of cars licensed this year to July 31 has been 63,097, as against 53,543 for a like period of 1913.

Tire Price Increase Almost Universal

Other Concerns Boost Prices

NEW YORK, Aug. 17—The tire and rubber situation this week is, if anything, more acute than it was last week. Last week the principal tire companies, with a few exceptions, had advanced prices from 12½ to 20 per cent. Some of the smaller companies had not announced changes. This week practically all have reached the higher level but none have advanced beyond the first increases following the advance in crude rubber.

The crude rubber situation, according to F. R. Henderson, of the rubber importing company, Henderson & Korn, is practically unchanged. The high price of \$1.10 for plantation and \$1.12 for para still holds without an advance and there is no more rubber in America now than there was a week ago. Neither is it likely that there will be any more for some time.

Press cables from Europe during the past week have indicated that shipping might be resumed within a short time. Without being pessimistic Henderson stated that the "short time" might be months. Private cables from London to the company state that the "resumption of shipping at first opportunity may mean many months." This is regarded as significant inasmuch as it is the scarcity of ships and not of rubber which has caused the shortage in America.

Ajax-Grieb, Kelly-Springfield and Michelin, which did not raise last week, are still holding to their old prices. As officers of the two former stated, they will not raise until the manufacturing cost actually increases.

Empire, Federal, Firestone, Fisk, Goodrich, Diamond, Goodyear, Pennsylvania, Republic and United States advanced last week 12½ and 20 per cent. Later advances are: Lee, 12½ per cent; McGraw, 15; Racine, 15; and of the importers, Engleberg, 10 per cent. Gaulois is awaiting advices from the factory in France before it alters prices.

A comparison of the new and old prices in a 34 by 4 size of those which have followed the raise is:

Lee Regulars—Plain, \$25.85, \$29.10; non-skid, \$33.10, \$37.25. Lee Puncture-Proofs—Plain, \$38.25, \$43.05; non-skid, \$47, \$52.90. Lee red tubes, \$5.75, \$6.45.

McGraw—Plain, \$24.35, \$28; non-skid, \$26.05, \$29.95; red tubes, \$5.45, \$6.25; gray tubes, \$4.90, \$5.65.

Racine—Plain, \$26.80, \$30.80; non-skid, \$33.50, \$38.50; red tubes, \$6, \$7.20; gray tubes, \$5.40, \$6.50.

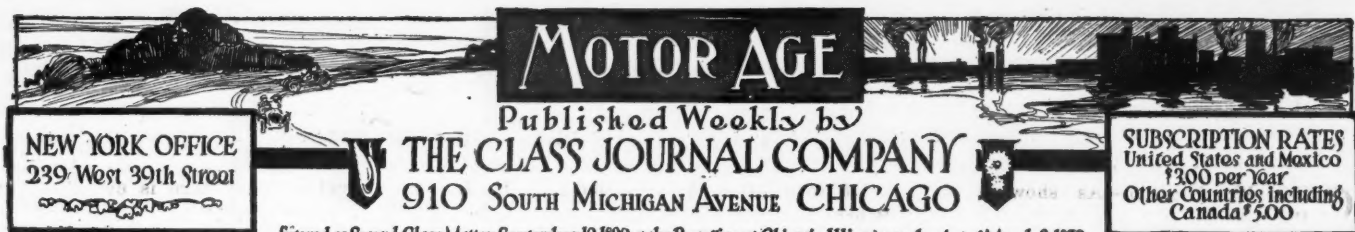
The 12½ per cent advance in Pennsylvania does not include tubes or vacuum cup tires which, the company having a good stock, were increased but 5 per cent. The red 34 by 4 tube went from \$7 to \$7.35 and the gray from \$5.30 to \$5.95. The vacuum cup in the same size was increased from \$41.95 to \$44.05. Smooth treads were increased from \$28.30 to \$31.85.

The Engleberg increase was thus: Plain, \$32.20, \$35.50; rubber non-skid, \$36.80, \$40.50; steel-studded, \$41, \$45. Tubes unchanged.

Goodyear Restores Old Prices

Chicago, Aug. 19—The Goodyear Tire and Rubber Co. today announced that it has returned to its original list on tires. "All advances—due to doubled cost of rubber—are withdrawn today on Goodyear tires," says the company. "This applies to dealers and consumers. We have secured from abroad sufficient rubber at former prices to warrant this announcement. Effective everywhere today, Goodyear prices are the same as they were before the war."

Here in Chicago it is not known where Goodyear discovered this new lot of rubber; neither do any of the local tire men know whether or not the Goodyear announcement will cause any of the other companies to change their present plans as to prices, probably because the announcement by the Goodyear has just been made.



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The Status of the 1915 Car

WHENEVER preliminary digests of the motor car market for the succeeding season are made, it has been the custom for the past 3 or 4 years to begin the article with a statement something like this, "Lighter cars at lower cost," until one might be led to the hasty conclusion that before very long the cars would weigh nothing at all and would cost proportionately. Such an ideal state of affairs is not to be hoped for, but the fact remains that there is a steady reduction each season in the weight of cars as a whole in their first cost, and in their cost per mile of operation. Where this tendency will end and what will be the eventual low-water mark in car cost is only to be guessed at at the present time by the public.

PRELIMINARY resumes of the 1915 cars, so far as may be gathered from the advance announcements of the manufacturers, indicate again a very decided reduction of the weight and of the list price of the cars as a whole. With the reduction in weight may be expected a lowering of the running cost—all of this notwithstanding the fact that there has been a rather general increase in the extent and quality of those added necessities and luxuries which generally come under the head of equipment.

FOR the past 2 years the slogan seems to have been light sixes. The tendency which has made this slogan possible seems to have continued in the 1915 cars, for there are more light sixes than ever before; they are lighter than ever before, and they cost less. This statement is made with full knowledge of the fact that the greater proportion of the cars announced by the new makers are four-cylinder ones.

Sport for Sport's Sake

MOTOR car racing has almost ceased to be a business proposition in America by which manufacturers aim to test and advertise their product. Within the past 3 years the pitting of high-speed mechanisms one against the other gradually has become a "sport for sport's sake," and the pendulum has more than swung back into the position it occupied in the days of the first Vanderbilt cup classics when individual entries were as prominent as factory nominations.

AS evidence of the truth of such an assertion, one has only to scan the list of entries for the annual road races to be run over the Elgin course this week. Out of a record number of 32 cars nominated, only four have been named by their makers: the two Stutzes and the two Mercers. The remaining twenty-eight cars either are owned by wealthy sportsmen, such as William Zeigler, Jr., E. C. Patterson, C. E. Erbstein, and E. J. Schroeder, by men who make of racing a business, like Ernie Moross or by drivers like Bob Burman.

THAT such was not the case 3 years ago is evidenced by glancing at the entry lists for the stock car championships which the present Elgin races replaced when the manufacturers turned down their thumbs on the promoters and refused to enter cars on the ground that the game was not worth the candle. Then the lists were made up entirely of factory nominations

IT may be taken as quite significant of the increased popularity of the light six that every one of the new fours announced so far is of unusually light weight and unexpectedly low price. This seeming contradiction of an increased trend toward the light six, in view of the superior number of new light fours, is explained by the fact that the light fours are the result of the popularity of the light sixes. When the manufacturer introduced his new light six he found that it was quite close in the matter of power, weight, and cost to his older large four. To avoid having the large four on his hands at the end of the selling season he had to redesign it for lower weight and lower cost or else drop it entirely and bring out a new four having these qualifications.

BASED on the announcement of 1915 cars up to date, which, by the way, includes almost all of the more important manufacturers, there will be at least half again as many six-cylinder models offered the motor buying public as there are four-cylinder models. Motor Age for the past 2 years has predicted that in 1915 the six would supersede the four in the point of popularity, so far as the number of different models offered to the public were concerned. These predictions will prove correct unless the manufacturers who have not announced their next season's product come out unannounced with nothing but four-cylinder models, which, by the way, is practically an impossibility.

SO far as the actual number of cars which will be sold during 1915 is concerned, the chances are that the majority of the people who buy cars in 1915 will buy four-cylinder ones just as they always have done.

and the battle of cylinders was a feud of engineers and designers.

WHEN the manufacturers retired from racing it was the individual sportsmen that stepped into the breach and saved the most thrilling of sports from extinction. Men who liked to see the wheels go round and gloried in the popping of the exhausts supplied the entries when the manufacturers refused their support. Although at first the fields were small in comparison, gradually individual interest has been so aroused that this year Elgin can boast of having more entries than ever before in America's road racing history.

THE game has lost nothing by the change. There is just as keen competition, just as many thrills, just as remarkable time, as in the days when the manufacturer was backing a fleet of speed creations. In only one respect has the sport suffered—in the pit work, which on the average was faster and more systematic when the factory crews were working jacks and handling tools.

WITH the advent of speedways in other cities than Indianapolis there should be an increased interest in racing, not only on the part of the public but among those sportsmen who have come to the rescue of the sport at the present time.

Record-Breaking Entry List for Elgin Road Races

Thirty-Two Cars Named for Kane County Classics

CHICAGO, Aug. 17—As showing that the interest in racing is keener than ever and that the European war is not having any effect on the sport in this country, the Chicago Automobile Club today announced a record-breaking entry list for the fifth annual Elgin road races which will be run off next Friday and Saturday.

Thirty-two cars for a total of fifty-eight entries are declared for the two days. On the first day, when the Chicago Automobile Club trophy will be contested for by cars of 450 cubic inches and under, twenty-six are nominated, while in the free-for-all for the Elgin National trophy on the second day, the full complement of thirty-two cars is billed to start. All cars are nominated for both days except the Lozier, Rae, Chadwick, Burman special, one of the Whites and one of the Duesenbergs.

This, it is claimed, will make the largest field of starters in an American road race, not counting the race from Los Angeles to Sacramento last summer, when fifty started. That was a straightaway race and not of the circular course variety.

It is a most representative field, too, made up for the most part of private entries. The Stutz, Mercer, and Maxwell really are the only factories directly represented. Others are backed by private owners and Chicago is particularly strong in this respect with nominations from Charles E. Erbstein, E. C. Patterson, and Frederick Robinson. Frank Fox of Indianapolis is another of those who back racing cars for the love of the sport and not because of trade inclinations.

The thirty-two cars represent eighteen different entrants. Six foreign machines—three Peugeots, two Sunbeams and a Mercedes—are in the lot while the White is a newcomer so far as Elgin is concerned. The complete entry list is as follows:

No.	Car and Entrant	Driver
1	Stutz, W. Ziegler, Jr.	F. H. Dearborn
2	Lozier, R. H. Knowles	L. Fontaine
3	Duesenberg, F. E. Duesenberg	E. O'Donnell
4	Maxwell, Moross Amusement Co.	T. Tetzlaff
5	Burman, Bob Burman	Not named
6	Peugeot, L. C. Erbes	R. Burman
7	Marmon, C. E. Erbstein	M. Stringer
8	Mercer, Mercer Automobile Co.	E. Pullen
9	Duesenberg, F. Duesenberg	E. Rickenbacher
10	Mercedes, E. C. Patterson	R. de Palma
11	Stutz, Stutz Motor Car Co.	B. Oldfield
12	Duesenberg, Fred Duesenberg	Tom Alley
13	Sunbeam, W. Ziegler, Jr.	H. Grant
14	Great Western, James Dorsey	W. Tidmarsh
15	Rae, Elmer Rae	Fritz Walker
16	White, R. A. Bennett	W. J. Shrunke
17	Marmon, Moross Amusement Co.	W. D'Alene
18	Mercer, Mercer Automobile Co.	S. Wisbart
19	Peugeot, Peugeot Import Co.	R. Mulford
20	Tahis, F. Robinson	M. Roberts
21	Stutz, Stutz Motor Car Co.	G. Anderson
22	Maxwell, Moross Amusement Co.	W. Carlson
23	Maxwell, Moross Amusement Co.	Not named
24	White, R. B. Bennett	Eli Callioutte
25	Mercer, Ed Schillo	C. Luttrell
26	Gray Fox, Frank Fox	H. Wilcox
27	Chadwick, Auto Service Corp.	J. C. Hoskins
28	Sunbeam, W. Ziegler, Jr.	G. Morris
29	Marmon, C. E. Erbstein	L. Heinemann
30	Braender Bulldog, W. Chandler	W. Chandler
31	Keeton, E. A. Moross	J. Callaghan
32	Peugeot, E. J. Schroeder	Not named

Of these, it is known that the E. J. Schroeder Peugeot will not start. Schroeder was the first to enter and he was counting on de Palma driving for him. Then de Palma signed with Patterson after which Schroeder abandoned all idea of coming to Elgin. No work has been done on the car since Indianapolis.

The Rae really is an old Mercedes rebuilt. It is of the vintage of 1903 and has been modernized by "Mercedes Fritz" Walker, who will drive the car himself. The Tahis is new, built by Frederick Robinson, a theatrical man who formerly was a locomotive engineer and who has introduced in it some of his own ideas.

The Elgin meet this year will differ from its predecessors in that the Pendleton system of scoring will be used whereby the position of each car at each milepost will be posted. This has been used at Santa Monica for several years with great success. Then the system of starting two cars at a time as in the French grand prix, will be used, which should add greatly to the interest in the races. The course is the same as before and in each race the distance will be the same—301.65 miles. The prize fund totals \$6,000, with \$2,000 for first, \$700 for second, and \$300 for third, with \$200 purses for the fastest lap each day given by Harry Vissering, president of the Chicago Automobile Club, and Martin J. Kavanaugh, also a member of the C. A. C.

Official practice started this morning with nearly every entrant at the course. The men will be given 2 hours each day. No practice will be allowed on Thursday. The races start at 11 o'clock each day.

BADGER RUN DETAILS ARRANGED

Milwaukee, Wis., Aug. 18—The fourth annual tour of the Wisconsin State Automobile Association, set for September 2, 3 and 4, and to be in the nature of an economy-reliability event under grade 1 rules of the A. A. A., will be run in six classes for the purpose of determining winners in the economy division. The executive committee of the Badger association has come to the conclusion that the price classification will be the most equitable for the purpose, and cars will compete for the economy prizes on the basis of list price. The six classes are: \$450 to \$800; \$801 to \$1,200; \$1,201 to \$1,600; \$1,601 to \$2,000; \$2,001 to \$3,000, and \$3,001 to \$6,000, or over.

There will be nine trophies to be contested for, as follows: The Sentinel \$1,000 cup, sweepstakes prize; Milwaukee Free Press trophy, for reliability showing; the Emil Schandern cup, for private owners, and the six Wisconsin Motorist trophies, for the winners in each class in the economy division. Entry blanks were issued

on August 15 and there is every reason to believe that a sufficient number of cars will be nominated by dealers and private owners to make the run a success.

ROCKFORD HILL-CLIMB RESULTS

Rockford, Ill., Aug. 17—The second annual hill-climbing contest of the Rockford Motor Club was a great success. R. O. Saynor's Apperson, driven by S. Ostewig, made the best time of the day, negotiating the hill in 27 seconds. There were nine entries in this event, the free-for-all, the prize being the R. J. Bryhn trophy. In event No. 1, for the Rockford Club trophy, a Ford won in 30 seconds, J. W. Santee driver. In event No. 2, for the F. A. Carson trophy, I. M. Bell, driving an Overland, won in 34 seconds. In event No. 3, for the Fay Young trophy, Fred Arnold, driving a Ford, won in 29 seconds. In event No. 4, for the Smith Oil Co. trophy, J. E. Eddy, driving an Oakland, won in 29 seconds. In event No. 5, for the T. D. Reber trophy, E. J. Gustafson, driving a Stevens-Duryea, won in 30 seconds. In event No. 6, for the Dealers' trophy, Edward Troller, driving a Chandler, won in 28½ seconds.

NEW ROAD SCHEME PROPOSED

Providence, R. I., Aug. 15—The Nash Motor Road Corp. of Rhode Island was incorporated at Providence today for \$100,000, divided into thirty shares of common and seventy shares of preferred stock, at \$1,000 a share. The corporation, according to its promoters, is ready to start business in Rhode Island by laying a road on some public highway, if permission is given, and if not then on some private way, for iron-tired and motor trucks and pleasure vehicles. The company will guarantee maintenance and repairs for 5 years under average conditions at an inclusive charge lower than the cost of any other road.

The highways built by the new corporation are controlled by six patents, two of which are basic, pioneer patents. The brick wearing surface has been thoroughly tested in the west, using brick inferior to the patented article of the company, and has met with approval and constantly increasing use. The road consists of two layers of blocks or bricks, separated by a layer of sand, which gives ample elasticity for iron tires and the special construction of the foundation layer affords a constant hygroscopic, that is to say, moist condition of the elastic sand layer. If the road is all that is claimed for it then it should be a big relief to the burden of road repairing by any state and city. Rhode Island highways builders are anxious to see a section tried out.

The Road to the Sea



THE ROAD TO THE SEA THROUGH THE AUSTRIAN ALPS

EDITOR'S Note—The annual Alpine tour is to European reliability runs what the French grand prix is to European road races, the classic. This year's competition, held in June and which is described in this article by an English journalist that rode in one of the competing cars, was a most arduous test for both man and machine and added not a little fame to the already famous drive over the most scenic of mountains. In all the 8 days of strenuous driving, 1,828 miles were covered and altitudes totalling 107,523 feet were climbed. The itinerary and distances covered daily by the cars follows: First day, Vienna to Klagenfurt, 260 miles; second day, Klagenfurt to Trieste, 250 miles; third day, Trieste to Toblach, 248 miles; fourth day, Toblach to Bozen, 200 miles; fifth day, Bozen to Innsbruck, 210 miles; sixth day, Innsbruck to Villach, 225 miles; seventh day, Villach to Salzburg, 212 miles; eighth day, Salzburg to Vienna, 223 miles. At the very outset of the tour, the motorists had an opportunity to show the climbing powers of their cars, for on the first day's run from Vienna to Klagenfurt they encountered eight passes with the following altitudes and distances: Hals, 1,431 feet, 6 miles; Rohrsattel, 2,644 feet, 8 miles; Preiner Gscheid, 3,307 feet, 7 miles; Niederalpe, 3,780 feet, 1 mile; Seeberg, 3,885 feet, 15 miles; Pack Sattel, 3,613 feet, 31 miles; Vier Thore, 3,605 feet, 12 miles; Frambacher Hohe, 2,173 feet, 15 miles. On the second day's run to Trieste, the tourists crossed the Seeberghohe pass, which has an altitude of 3,773 feet and is 26 miles in length. Muddy going added to the natural difficulties made the run from Vienna across the Austrian Alps to the Adriatic sea a most thrilling and arduous trip.

THE early morning light flickered across the street, playing fitfully with the deep shadows in which the ancient church lay hid. The mountain village still was deep in slumber, the stillness broken at intervals by the bark of a dog or the tinkle of a cowbell in the valley. The soft hum of our engine suddenly broke the spell: here and there a door opened in the square, and inquiring eyes looked out from a land of dreams. The white robes of sleep stirred softly in their flight before the quickening touch of the sun.

The Start of the Tour

As we left the peaceful square, busily preparing for the work of a new day, a small boy in charge of a barrow-load of milk-cans, drawn by a great St. Bernard, quickly pushed the vehicle aside, and as we passed him he gave us a bright smile of welcome and waved his little cap in the air. The road rose abruptly from behind the village church, and our Rolls-Royce gaily answered to the joyous call of the morning. The road is of generous width, the corners finely curved and graded, the gravel surface smooth and unbroken. The car quickly warmed to the ascent, and as we swept round each bend in the road as it mounts the face of the mountain in an apparently unending series of zig-zags, the thrilling sensation of ascending an Alpine pass for the first time afforded us an altogether new experience.

The daring construction of the road itself came as a revelation. To secure an equal grading of 1 in 12 to the summit

By J. I. Ker

it had been shaped out of the mountain-side, and rose upwards in a long winding series of terraces. So easy was the ascent that it was only when one caught a glimpse of the village beneath as it slowly

receded from view until the church seemed like a toy, that we realized that we were climbing—and that to some purpose. The great white-walled schloss that seemed to stand on a dizzy height when looked at from the village beneath was now a tiny object in the valley.



SUMMIT OF THE LOIBL PASS ON ROUTE OF ALPINE TOUR

On the pine-clad slopes of the mountain, across the gorge, a great Alpine hotel, with its warm red roofs and terraced gardens, overlooked a scene of rugged grandeur, but soon we had left it far beneath us, and still the winding road swept upwards. Gradually the distant peaks came into clearer outline, and we could see the great somber pine woods rising precipitately from the ravines beneath, and the snow-clad summits glistening in the sunlight.

Across the face of the mountains soft fleecy clouds sought the shelter of the frowning cliffs, from which the warm radiance of the sun at length dispersed them. A snow-laden wind greeted us as we reached the summit. Though our road had brought us some thousands of feet above sea level, mountains soared above us, and far to the south the spreading light slowly disclosed peak upon peak in bewildering succession. Our road, we knew, had been an easy one so far: it still had many mighty mountains to traverse, many deep ravines to cross, many torrents to bridge, many Alpine barriers to surmount ere it reached the sea. But one's first impressions often are the most enduring, and when my thoughts carry me again and again to the mountain lands of Austria, it is this, my first sight of the Alps, that invariably "flashes across the inward eye."

Road Testimonial to Man

The thought that somewhere amidst that mighty range of mountains, piled upon each other in majestic confusion, lay our road to the sea, gave us comfort. We knew that it would welcome us in the green valleys beneath and guide us with unerring hand over these rugged heights making the rough places plain, bringing us at length to our journey's end in safety and quiet repose. The wondrous design of our road to the summit, from which we now looked into the far distances of the south, had strengthened our faith in the power of man, in his daring and ultimate achievement. And if our road meantime seemed to be lost to us in the valley beneath, we knew that through the maze of the woods man had hewn his way, piercing the mountains and sealing the heights, with axe and pick, that the progress of thought and human activity may triumph at the last.

Such were the impressions that crowded upon my mind as we looked out upon the amphitheater of the hills from the summit of the Semmering pass on our journey southwards from Vienna. We had left the sweeping plains of Austria behind, and had reached the first slopes of the eastern Alps, which stretched across the ancient province of Styria. The mountain village of Semmering lies 50 miles southwest of the capital. Our road across the pass was a well-defined bridle track as far back as the thirteenth century, and a pilgrim way to the east.

Its ancient story emerges in the ro-



IN THE MUR VALLEY

mantic days of the Crusades, but is lost for a long period in the gloom of mediæval times. In 1728 we hear of it again, when the great Emperor Charles VI. rescued it from obscurity and re-formed it for military purposes. Until the beginning of the nineteenth century the road over the Semmering, with the exception of the Brenner and the Taurin, was the only highway traversing the eastern Alps.

The present road was built in 1841, and the railway followed in 1848. From the summit of the Semmering the panorama

of mountain landscape is of a most impressive nature. The highest peak in lower Austria—the Schneeberg—6,805 feet—easily is distinguished overlooking the Höllen tal or valley. To the right the Rax Alps rise in stern majesty from the green valley beneath: far to the left we catch the distant peaks of the Leitha mountains, which separate Austria from Hungary: on the rugged slopes of the Kartnerkogel on the opposite side of the valley stands a picturesque hotel, a favorite resort of the Viennese, surrounded by many beautiful villas and castles of wealthy Austrian noblemen.

Descending Valley of Mur

Descending to the finely wooded valley of the Mur, our road proceeds southward to Bruck, a ducal residence of the governors of Styria. Gratz, our next place of note, is 1,135 feet above sea-level, and is the most important town in the eastern Alps. Occupying a commanding position above the valley of the Mur, its fine old Gothic cathedral (1449), its historic Landhaus (1558), and many Gothic and renaissance buildings give it an old-world appearance. For many years it has been the capital of the Duchy of Styria, and is a garrison town of considerable strategic importance to the empire. From Gratz the main road through southern Austria to the Adriatic proceeds through Marburg.

To enable the reader to form some impression of the extraordinary severity of the route traversed on the first day of the recent Alpine trials, I purpose following part of the road embraced in that historic contest, over what is known as "the Pack," thence by way of Klagenfurt and Krainburg to Liabach and Trieste. I should say here that it would be difficult



VIEW SHOWING THE EASTERN ALPS OF AUSTRIA



BY THE SHORES OF THE ADRIATIC

to exaggerate the terrific strain to which the cars were subjected on this part of the route. Gears, springs, steering mechanism, engine power, water-cooling arrangements, brakes—all were called upon in turn, and the highest demands made upon them.

An Arduous Motor Test

The tests were admittedly abnormal, comprising, in a distance of about 150 miles, by reason of the extraordinary road conditions, a series of tests more severe and more numerous than would be met with in a year's travel under ordinary touring conditions in this country. For example, one well-known British competitor assured me that on the ascent of the Pack his car used more water in 10 minutes than it would use in the course of 6 months' touring in England. It was on this road or track, admittedly a freak hill, that one of the finest British cars in the contest had its gearbox completely smashed by a great block of sharp-edged stone lying hidden in one of the caniveaux on the ascent.

It is not the purpose of this article to discuss the question as to what useful purpose is served by the inclusion of such roads in a contest of this kind—a test "to extinction" it has been called by a well-known writer—but it may certainly be claimed that only cars of outstanding qualities in mechanical design and workmanship could successfully emerge from such a series of tests as those provided in the recent trials.

The pack road strikes off in a westerly direction from Gratz, and rises into a wild and mountainous region above the valley of the Mur. The stiffest part of the ascent begins at the little mountain village of Koflack. Narrow and tortuous, the gradient for a distance of 7 kilometers varies from 1 in 6 to 1 in 10. This in itself is not excessive, but the nature of the road accentuates the difficulties of the ascent.

On many of the mountain roads of

Austria the water is drained off the roads by means of caniveaux or gulleys sunk slantwise into the road at regular intervals to the summit on either side. Great logs of pine are used for the purpose of strengthening the ridge-like formations, the logs being indifferently banked in with gravel and small stone. The caniveaux are used by the local wagoners in the ascent and descent of the hill, who take advantage of the ruts, into which they drag the wheels.

Work of this kind is of the most laborious and difficult nature, in some cases as many as twenty bullocks being required to draw a heavy vehicle to the head of a mountain pass. The road thus gradually becomes entirely broken up in the rainy season, the caniveaux filled up with soft mud, and the bared pine logs make the road almost impassable.

Plough Through Mud

On the occasion of the recent contest the Pack presented a most extraordinary appearance. The cars simply nosed into seas of mud, ploughing their way out of one gully, rearing and snorting over the next 20 yards into the next, and so on, wildly struggling like some mad things for a grip, while the wheels spun around on the smooth logs or in the bottom of the trenches.

One had to be content to take "one at a time"—there was no possible way in which to "rush" such a road. Each in turn had to be patiently and slowly tackled, and when I mention that over 100 such caniveaux had to be surmounted on the Pack, that the mud rose to the hubs and back axles, and that the rain poured incessantly during the ascent, some

idea may be formed of the terrific strain experienced that day by cars and drivers.

C. L. Freeston, the most distinguished writer and authority on the Austrian roads in this country, declared that the Pack was the worst hill he ever had climbed in his whole experience of Alpine touring, and certainly I can imagine nothing more extraordinary or more exhausting in the shape of a road. It remained one of the steps of a gigantic ladder which the great mammoths may have used in prehistoric times when they sought the solitudes of the mountain peaks.

The sensations experienced during the ascent were anything but pleasant. The descent was even more disagreeable, but as I do not wish to harrow the feelings of the reader, let me say that we reached the little township of Twimberg in the valley beneath, with thankful hearts.

Pack Ascent Most Difficult

Only one other pass during the succeeding days of the trial at all resembled the Pack—namely, the Krenzensberg—but fortunately on this occasion the weather conditions were more favorable. It was conceded by the competitors, without exception, that the Pack was the most severe test to which the cars had been subjected in the entire contest. As I already have explained, however, it cannot be taken as a typical Austrian road, and our experiences should in no way discourage motorists from a contemplated tour in the eastern Alps of Austria.

At Twimberg we joined the main road from Gratz to Klagenfurt by Leoben and St. Leonhards, and continued along a finely wooded valley, over which rise the Save and Kor Alps. At Wolfsberg, where our car was held up for want of gasoline, we experienced an instance of the hospitable nature of the Austrians. The driver had brought the car to a standstill opposite to the entrance of one of the villas that lined the road entering the town. A small crowd of spectators immediately surrounded us, and we had many offers of assistance at once. One good woman brought us light refreshments on a silver salver, and some bright children brought us flowers and post-cards of the place. I mention this as only one of

many occasions on which we received a hearty welcome from the Austrians, whose keen love of sport is only equalled by their generous warm-hearted nature.

From Wolfsberg the road gradually rises above the wide fertile valley of Rosenthal, through which winds the silver waters of the Drau. At length it enters the ancient town of Klagenfurt, 1,464 feet above sea-level. The valley here is enclosed by finely wooded hills, over which



A FAIR MAID OF CARNEOLA

tower the giant peaks of the Karawanken Alps. Klagenfurt is a town of spacious squares and public parks. The Ring strasse or boulevard is lined with handsome buildings, and is erected on the ancient fortifications of the town. We now are in the one-time capital of the Duchy of Carinthia, and the scene of many fierce conflicts with the Turks. In 1335 it passed into the hands of Austria, but its history goes back to Roman times, when it was a station of considerable importance. The great Roman highway to the north traversed the mountain lands of Carinthia, and the museum at Klagenfurt contains many evidences of Roman life.

From Klagenfurt our road strikes due south across a ridge of the Karawanken Alps and enters the fair lands of Carniola by the famous Loibl pass. Thence it descends to the valley of the Save, and, passing through Krainburg, it winds along the banks of the river to Liabach, the capital of Carniola. Sir Humphrey Davy has described this interesting province as a country of wonders. It is the only Slavish district in the Alps: its people, mostly engaged in agriculture, offer a strange contrast to the Austrians in their language and customs, reminding one forcibly of the east. Their picturesque costumes, embroidered in gold and silk, immediately arrest attention, and their manners are more reserved than those of their neighbors in Carinthia.

A Land of Contentment

It strikes one as a land of plenty; the farmhouses are clean and comfortable-looking, and the peasants seem prosperous and contented. Liabach, the capital, is the seat of the provincial government—Lyubljana, "the white town," it is named by the Slovenes. It is a town of great importance in the southern portion of Austria, and is a powerful factor in the affairs of the empire on account of its wealth and strong Slavic population. Before reaching Trieste we pass through the interesting town of Adelsberg, an active military depot for South Austrian troops.

Behind the main street stands the entrance to one of the most remarkable grottos in the world. The queen of Roumania, Carmen Sylva, calls it a fairy-land extending underground. Its splendor is indeed overpowering. Beneath high domes the most fantastic stalactites and stalagmites have formed in the course of the ages, numberless shapes and configurations surround you on every hand, and many of the great freakish temples of nature have appropriately been named the Cathedral, the Pulpit, the Dancing Hall, the Sword

of Damocles, and so on. They cannot fail to strike the visitor with awe, and the 2 hours which it takes to explore the vast caverns, lit throughout with electric light, are well and profitably spent.

Crossing a Barren Moor

The last stage of our journey lies across a great stretch of barren moor on which large boulders of rock have been strewn as if with a giant hand. The road is wide and straight. As we emerged from a tunnel-like formation in the rocks and commenced a long winding descent, we paused. Trieste lay at our feet, within sound of

the song of the sea. Beyond stretched the great blue Adriatic, shimmering in the warm sunlight, smiling a joyous welcome to us on the heights above. The soft air was fragrant with perfume from the terraced vineyards that swept downwards to the sea. Our road to the sea had not failed us. It had indeed brought us in due time to a fairy region of garlands and flowers and the hum of bees. And across the horizon lay the smiling expanse of sea, which beckoned us from our upland conflict to a brief season of repose in "the haven under the hill."

Answers to Inquiries for Motor Routes

Exeter, Neb.-Detroit, Minn.

EXETER, Neb.—Editor Motor Age—What is the best route to Detroit, Minn.?—Wm. P. Wallace.

At Fairmont you will strike the Meridian road, which you should follow north to Fargo, N. D. This road lies through York, Stromburg, Osceola, Shelby, Columbus, Humphrey, Madison, Norfolk, Pierce, Wausa, Yankton, Freeman, Bridgewater, Salem, Madison, Arlington, Watertown, Sisseton, Vernon, White Rock, Wahpeton, Abercrombie, Christine, Hickson, and Fargo. Fargo to Detroit is 49 miles through Moorhead, Dilworth, Hawley, and Auburn.

Chicago-Midland, Ont.

Chicago—Editor Motor Age—What is the best route from Chicago to Midland, Ont., by way of Detroit and Toronto; also from Chicago to Antigo, Wis.? What book covers these two routes?—H. T. White.

The road used by most all tourists between Chicago and Detroit is one that takes 2 days' traveling through Roseland, Kensington, Thornton, Highlands, Hobart, Valparaiso, LaPorte, South Bend, Niles, Dowagiac, Kalamazoo, Battle Creek, Albion, Jackson, Chelsea, Ann Arbor, Ypsilanti, Wayne, and Dearborn.

Crossing into Canada to Windsor your run to London is via Windsor, Ruthven, Leamington, Cedar Springs, Blenheim, Ridgetown, Highgate, Clachan, Wardsville, Melbourne, Delaware, Lambeth and a good gravel road of 73 miles extends to Hamilton through Crumlin, Thamesford, Ingersoll, Woodstock, Cathcart, Burford, Cainsville, Alberton, and Ancaster.

It is 47 miles to Toronto through Aldershot, Freeman, Trafalgar, Cooksville, and Lambton Mills with an occasional poor stretch of road.

Running directions of the trip can be had this far, but beyond through Aurora, Bradford,

Barrie, and Orillia to your destination you will not be able to secure any.

Your Chicago to Antigo, Wis., run first takes you to Milwaukee, 95 miles, through Evanston, Wilmette, Deerfield, Sylvania, Kilburnville; then 125 miles to Green Bay over good gravel roads through Port Washington, Sheboygan Falls, Manitowoc, Denmark, and Pine Grove; then west to Antigo through Howard, Shawano, Thornton, Tilledo, Birnamwood and Aniwa.

Redwood Falls, Minn.-Topeka, Kan.

Belview, Minn.—Editor Motor Age—What is the best route from Redwood Falls to Topeka, Kan., giving distance and road conditions?—H. W. Pease.

The road is quite rolling to Sioux Falls, but good surface through Vesta, Marshall, Lynd, Russell, Tyler, Lake Benton, Pipestone, Egan, Trent, and Dell Rapids. Good dirt roads prevail to Omaha routing 95 miles to Sioux City via Harrisburg, Canton, Beloit, Fairview, Hudson, Hawarden, Akron, Westfield, and 113 miles to Omaha via Homer, Winnebago, Lyons, Oakland, Craig, Tekamah, Blair, and Florence.

Natural dirt roads are to be found to Topeka, 193 miles through Albright, La Platte, Plattsmouth, Murray, Lincoln, Nebraska City, Auburn, Howe, Verdon, Falls City, Hiawatha, Horton, Whiting, Holton, Mayetta, and Hoyt.

Paris, Tenn.-French Lick, Ind.

Paris, Tenn.—Editor Motor Age—Please furnish the routing with road conditions to French Lick, Ind.—W. C. Johnson.

If you will route to Clarksville you may be able to find a road which connects with the Nashville-Louisville road at Gallatin, but the only road Motor Age knows takes you to Nashville from Clarksville through Adams, Cedar Hill, Springfield, and Joelton then going north on the road to Louisville is 103 miles to Cave

City over a very fair road through Edenwold, Gallatin, Sideview, Scottsville, Pageville, Glasgow, Good Night, to Cave City then 103 miles to Louisville over a much improved road through Bear Wallow, Hardyville, Pikeview, Buffalo, New Haven, Bardstown, High Grove, Mt. Washington and Beuchel.

A toll road most of the way, it is 59 miles to French Lick through New Albany, Mooresville, Galena, Palmyra, Fredericksburg, Hardinsburg, Paoli, and West Baden.

Shreveport, La.-Galveston,

Shreveport, La.—Editor Motor Age—Kindly give the best route to Dallas and from Dallas to Galveston. What are the conditions from Marshall on? Is this in the Blue Book?—R. C. Carr.



SOLDIERS ON GUARD AT THE FOOT OF "THE PACK"

Motor Age is not able to secure information on the road through Marshall, but from Texarkana you can reach Dallas by way of New Boston, DeKalb, Annona, Clarksville, Detroit, Blossom, Paris, Brookston, Petty, Honey Grove, Bonham, Whitewright, Vada-lia, Anna, McKinney, and Richardson. It is 179 miles to Madisonville. The first 50 miles is macadam through Lancaster, Red Oak, Waxahachie and Reagor Springs and the rest of the way is natural dirt with some sand routing through Corsicana, Wortham, Mexia, Teague, Jewett, Centerville and Leona. The road to Galveston is 152 miles, the natural dirt with stretches of sand continuing through Huntsville, Elmira, New Waverly, Willis, and Conroe, to within 20 miles of Houston from which point a macadam and shell road extends to Galveston through Houston, Webster, League City, Lamarque and over the \$2,000,000 Galveston causeway.

This route is outlined in the Blue Book 5, then there is another road from Madisonville recommended by a Texan which extends through Navasota to Hempstead to Houston, but the Blue Book does not give running directions on this one.

O'Neill, Neb.-Kankakee, Ill.

Inez, Neb.—Editor Motor Age—Please outline a route from O'Neill, Neb., to Kankakee, Ill., via Richland, Ia.—E. A. White.

You should head for the Meridian road either just beyond Osmond reached through Orchard, Copenhagen and Breslau or at Norfolk, reached through Stafford, Clearwater, Neligh, Oakdale, and Battle Creek.

From Norfolk on the Meridian your route south through Madison, Peck, Humphrey, and Tarnov to Columbus on the Lincoln highway, thence east on it through Schuyler, North Bend, Ames, Fremont, and Elkhorn.

The best road to Des Moines is partly over the Great White Way and partly over the River-to-River road and takes you through Council Bluffs, Oakland, Lewis, Atlantic, Wota, Anita, Adair, Stuart, Adair, and Van Meter, being a distance of 143 miles.

From Des Moines to reach Richland the towns are Prairie City, Fairmont, Monroe, Otley, Pella, Oskaloosa, Cedar, and Fremont, then continuing through Iowa strike Brighton, Washington, Columbus City, Fredonia, and Muscatine.

Through Illinois to Kankakee your towns are Moline, Atkinson, Anawan, Sheffield, Wyand, Princeton, Hollowayville, Peru, La Salle, Ottawa, Streator, Dwight, Reddick, and Goodrick.

Shreveport, La.-Houston, Tex.

Shreveport, La.—Editor Motor Age—Kindly give the best route to Houston, Tex. I would like to touch Palestine if possible.—R. L. Pettigrew.

So far Motor Age has been unable to secure information on the road to Palestine, and as this is not a trunk line road it is rather difficult to get first-class data. From Palestine, however, it is 190 miles to Houston by way of Elkhart, Grapeland, Crockett, ferrying across the Trinity river at Clapps ferry, Madisonville, Navasota, and Hempstead. This road is fairly good and can be driven in 2 days with ease. J. L. Smith, of the Palestine Grain Co., Palestine, Tex., will give you a more detailed description than is possible on paper if you will get in touch with him.

Road Conditions in Montana

For the information of motor tourists who contemplate making a trip from Missoula, Mont., west to Spokane, or through Washington and Idaho points, George R. Metlem, secretary of the Montana highway commission, has secured the following data regarding road conditions now prevailing in the western part of Montana:

Of the main state roads leading west from Missoula the tourist has the option of three outlets to the states of Idaho and Washington,

first, by way of St. Regis, to Wallace, Idaho; second, by way of Ravalli Plains, Thompson Falls to Spokane, Wash.; third, by way of Ravalli, Polson, Kallispell, Libby and Troy to Spokane, Wash.

It is true the grade just west of St. Regis is rather steep, but a new grade is being constructed, the work being in progress at this time, and when completed it will not exceed a 10 per cent minimum at any place. At present cars that are unable to pull the old grade will be taken over without any charge by the teams working on the new grade.

Tourists taking this route will do well to replenish their gasoline supply at St. Regis in order that they may have a full tank when the steep grade is reached.

The roads west of Wallace to Spokane, are in good condition. Leaving Missoula on the route by way of Thompson Falls, a good road has been constructed from Missoula to Ravalli and from that point the road leads down to Clark's Fork river. The best road from that point to Spokane follows the line of the Northern Pacific railway, and is also in splendid condition.

The third route, leaving Missoula west by way of Ravalli over the Flathead Indian reservation to the foot of Flathead Lake at Polson. Here the tourist should take the west side lake shore route via Dayton. This road is open to traffic at all seasons, and leads to Kallispell. From Kallispell west the outlet is over the old line of the Great Northern railway to Marion and Jennings thence through Kootenai Canyon to Libby.

At the present time the outlet from west of Libby is complete to Spokane, and it is expected that the new road between Libby and Troy through the Kootenai canyon will be opened to traffic September 1. At the present time the Great Northern has an accommodation by which cars can be shipped from Libby to Troy, Idaho. Open end railroad cars are available at all times at both places and suitable loading platforms are maintained. If this route is used it gives the motorist an opportunity to tour the Glacier Park and Flathead country, then to continue on west to Spokane.

Much good road work has been done in the state during the past year.

Advantage Is With American Makers

Argentina Representative Discusses Wars' Effect

NEW YORK, Aug. 12—American motor car manufacturers now have the advantage over the European makers in respect to the South American trade. The United States has the chance of its history to dominate in exportations to the lower continent. Honesty is necessary in all negotiations as there have been evidences of highly developed "Yankee thrift" and "get-rich-quick" sales methods in the past, and the Latin Americans now are suspicious of products from the United States.

These points were accentuated in an interview given today by Ricardo C. Tort, chancellor of the consulate general of the Argentine Republic. Said Senor Tort:

"In 1912 the total imports of motor cars in Argentina were 4,281 cars, of which 1,651 were bought from France, 708 from the United States, 627 from Germany, 451 from England, 422 from Italy, and 295 from Belgium.

"Since then the imports have increased as financial conditions have improved. The war is a heavy strain on the country now, of course, and it has been necessary to declare a moratorium. Still Argentina is no worse off than other countries.

"It is probable American imports, prior to the war, were not increasing so satisfactorily inasmuch as a bad feeling was developing toward American cars.

"Cars that sell for \$1,000 and under with all equipment in the United States were priced at \$2,500 and \$3,000 without equipment in Argentina. This is not due to the heavy cost of shipment, which is light. And the duty is only 10 per cent.

"As soon as the Argentina people found out that they were paying the same price for cheap American cars as was quoted them for Panhards and Isottas and Mercedes, naturally they would not buy the American cars so readily.

"The Argentina people are not mechan-

ically inclined in the slightest degree. Therefore, all have chauffeurs to whom the operation and maintenance of the cars are exclusively left. Practically all of these chauffeurs are Germans, French and Italians, the last two principally. It is natural that when an owner leaves the purchase of a car to his chauffeur, the chauffeur will prefer to buy a car from his own country.

"A further consideration is the fact that practically all of the foreign manufacturers keep large stocks of repair parts in Argentina and there is no delay in obtaining supplies. Most of the American makers keep no such supplies and, therefore, when a part breaks there is a delay of months until the part is obtained from the United States.

"An average chauffeur in Argentina is paid from 200 to 250 pesos a month—from \$100 to \$125. There are some that get more, and many less. All of them make extras as they take advantage of the mechanical ignorance of their employers and take every chance to have the cars sent to the repair shops from which they receive tips.

"Because of the revelations that prices for American cars are out of reason and that cheap cars—that seem just as shiny and complete to an Argentina man as the expensive European cars—are being unloaded on them as good grades, the American cars have become somewhat a joke. They call them 'coffee pots.'

"Out of the 1,651 cars imported into Argentina from France in 1912, I guess that 1,200 of them are Panhard. All of them probably are giving good service and their popularity is growing.

"The American makers can sell good cars in Argentina. There also is a market for the medium and cheap-priced cars, if they advertise them honestly and look after supplying parts."

White Owners In Kansas Tour In Colorado Territory

Manhattan Organizes Big Run of Seventeen Cars

HAYS, Kan., Aug. 17—Special telegram—The first annual tour of the White owners of Kansas is now under way and the motorists are 1 day nearer their destination, Colorado.

After a run of 184 miles from Manhattan today, all the machines checked in here tonight on schedule and without encountering any engine trouble. Owing to the excessive heat in Kansas, there was some tire trouble but only a little time was lost in changing cases and tubes.

Forty White cars were scheduled to make the tour but a number of ranchers were forced to withdraw their machines at the proverbial eleventh hour because of the condition of the corn crop. The motorecade at the present time consists of seventeen cars, but this number will be augmented before Denver is reached.

The Kansas roads proved excellent for touring. After passing Salina, the roads on the Golden Belt route are as hard as macadam and the recent rains have laid the dust. The commercial clubs in the various cities along the route have worked the roads in anticipation of the coming of the gasoline pilgrims and the result has been boulevard going all the way.

The spectacle of a hundred or more motorists participating in a 1,500-mile pleasure tour, riding in so many cars of one make and all gathering around a roadside campfire each night, is unprecedented in American touring. It shows the remarkable esprit de corps of White owners throughout Kansas and should give a considerable impetus to organized touring, inasmuch as it shows the attitude of motor car owners toward easy tours.

With camping as a diversion second only to seeing Colorado's scenic wonders, the White owners are promised a trip which very few would make individually. The tourists will drive west across Kansas, over the famous Golden Belt route to Colorado. After touring in Colorado for 4 days they will proceed to Pueblo and return to Manhattan over the historic Santa Fe trail.

The tour is the result of the desire of almost every owner in Kansas to tour Colorado. To enroll a large number of Kansas owners of White cars in this camping tour required only the invitation of S. W. Forrester, the White dealer in Manhattan. When Mr. Forrester announced his plans for an easy-going sight-seeing and camping tour on good roads, without severe rules or running schedules, he met with an instant response from owners who prefer long distance touring without competitive features.

The pilot of the tour, Dr. Willhoit, of Manhattan, fixes each day's pace to suit the wishes of the tourists. In his White roadster he precedes the main

body by sufficient time to select and establish each day's camping grounds. Although complete camping outfits are carried on each car it is not expected that every entrant will pitch camp every night. Nothing in the rules will prevent an entrant from patronizing a hotel if he desires. To carry excess baggage and an extra supply of tires, a White 1,500-pound delivery truck is accompanying the tourists.

Starting from Manhattan early this morning the first day's run took the tourists 180 miles to Hays, Kan., passing through Abilene, Salina, Ellsworth and Russell. Tomorrow the route will be somewhat longer, 219 miles, passing through Wakeeney, Oakley, Colby and Burlington to Siebert, Colo. Although this mileage seems extraordinary for a pleasure tour, the roads through western Kansas are as level as a floor and as hard as macadam at this time of the year so that no trouble is expected in covering this distance. On the third day, a run of 145 miles will take the tourists through Limon and Bennett to Denver.

After touring Colorado for 4 days and driving to Pueblo, the return trip will be made via La Junta and Lamar, the night stop being Garden City, Kan., a distance of 231 miles. The next day's route will include Dodge City, Great Bend and Lyons, ending at McPherson. On August 27 they will pass through Herrington and Junction City on their final run of 101 miles to Manhattan.

Nearly every type of White gasoline car is represented in the tour. Even the first White car sold in the state of Kansas was entered by its Manhattan owner, and will be the official publicity car, carrying newspaper men from Kansas City, Topeka, and Manhattan. This car has been driven almost constantly in all kinds of weather and over all kinds of roads for 6 years.

DODGE BROS. FIGHT FOR NAME

Detroit, Mich., Aug. 17—Dodge Bros. have filed a suit in the circuit court of Michigan against the Dodge Motor Car Co. to restrain the latter from using the name Dodge on its products in its advertisements—in fact, in any matter concerning its business.

It is claimed by Dodge Bros. that the officers and stockholders of the Dodge Motor Car Co.—Alvan M. Dodge, J. Moyer Leman, E. O. Millay, Edwin Herzog and George E. Sheldrich—are trying to profit by the name of Dodge Bros., which has existed for the last 12 years in Detroit and whose business is so well established and known throughout the country.

J. Moyer Leman, of the Dodge Motor Car Co., when asked today concerning the

Dodge Bros. suit, said: "All we know about this suit is what we have read in the daily papers. No papers have been served on us as yet, and if they are we will fight the case."

COLORADO RUN NOW ON

Colorado Springs, Colo., Aug. 17—Headed by Mayor Charles L. McKesson of Colorado Springs and Mayor M. A. Nicholson of Leadville, a score of cars, representing eight states left Colorado Springs this morning for the reliability-sociability run over the Pikes Peak Ocean to Ocean highway to Salt Lake City. For a week the travelers will cross the wonderful scenic sections of the Colorado and Utah mountains, arriving at the Utah capital on Monday, August 24. The trip is arranged in easy stages such as the average family touring party would want to make on a transcontinental journey, the day's mileage varying from 45 to 136 miles according to the variety of things to see and the entertainment features as arranged at the towns along the way. It is only another example of the enthusiasm of the westerners over good roads.

CHANGES IN SAXON AGENCIES

Detroit, Mich., Aug. 18—The Saxon Motor Co., which manufactures the Saxon light car, has made several changes with respect to its agents in different sections of the country, the most important of which is the changing of the New York city agency into a branch. Heretofore the Saxon business was handled there by L. A. Van Patten, Inc., 251 West Fifty-Seventh street. This concern now has been taken over by the manufacturers and the business hereafter will be conducted under the name of the Saxon Motor Co. of New York. Part of the building on Broadway and Fifty-Fourth street has been leased to serve as service station. In Newark, N. J., the Essex Motor Car Co. now has the agency for the Saxon; in Kansas City, Mo., the Bond Motor Co.; in Omaha, Neb., the Lininger Implement Co., and in Spokane, Wash., the Hotchins-Fosdick Co.

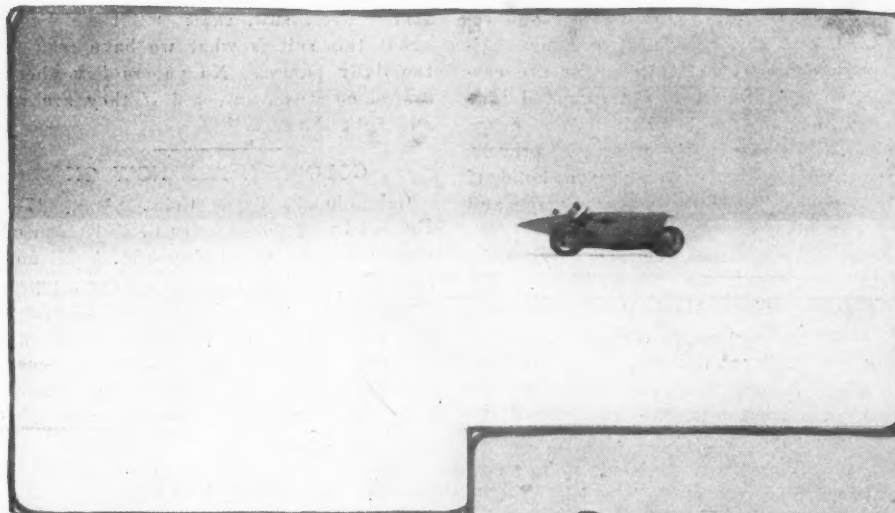
FIRE AT SPEEDWAY

Indianapolis, Ind., Aug. 18—With a loss that may exceed \$25,000, the aerodome at the Indianapolis motor speedway was destroyed by fire yesterday. The building burned rapidly and was totally destroyed, together with its contents. The origin of the fire is not known, but it may have been due to spontaneous combustion.

There were no other buildings near, the aerodome being located in the southeast part of the speedway grounds. The aerodome was 280 feet long, 60 feet wide and 50 feet wide. It probably will be rebuilt.

Salt Beds of Utah Rival Ormond Beach as Speed Course

Tetzlaff in Benz Does Half-Mile at 142.8 m. p. h.

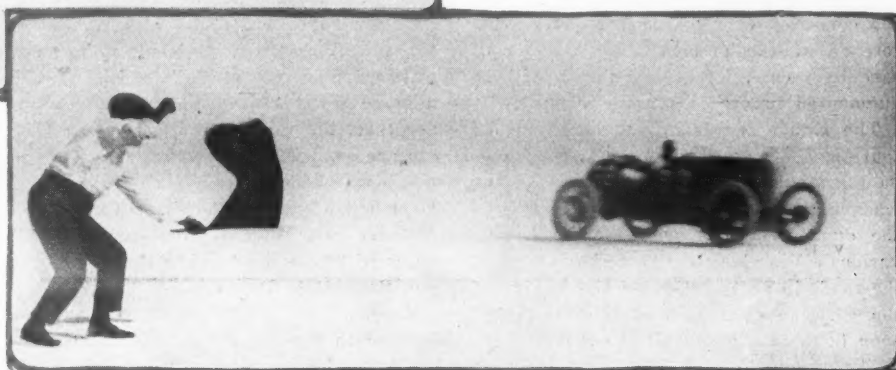


TETZLAFF IN BENZ IN 1/2-MILE RECORD TRIAL

SALDURO, Utah, Aug. 11—Bob Burman's star is in eclipse and the sands of the Florida beaches no longer are the last word in speed courses. A new and epochal chapter in motor racing history was written here today and Teddy Tetzlaff was the author. Driving the 300-horsepower Jumbo Benz, the intrepid Californian covered 1/2 mile on the Salduro salt beds in 12 3/4 seconds, or at a speed of 142.8 miles an hour.

As a result of his spectacular achievement today, Tetzlaff has earned a niche in speed's hall of fame beside that of Fred Marriott, Barney Oldfield, Bob Burman and Arthur Duray. His mark beats that of Bob Burman, who in the spring of 1911 at Daytona-Ormond covered a mile in the Benz at a speed of 141.73 m.p.h. and established his right to boast of having traveled faster in a motor car than any man. Tetzlaff's time, however, falls 1/10 mile short of the world's mark of Arthur Duray, the Frenchman attaining a speed of 142.9 miles an hour in an attempt to break the kilometer record.

The drive was not electrically timed, and therefore will not stand as official, although permission to hold the trials was given by the American Automobile Association to W. D. Rishel, representative of the A. A. A. contest board from Utah. The timing was done with stop watches, more than twenty being snapped on the car, and there is no question about the correctness of the time as close as is possible to time such an event with stop watches. There is also no question but that Teddy Tetzlaff or any other driver, by spending a couple of weeks on the salt beds, tuning up the big Benz and thoroughly mastering the atmospheric conditions, with an electric timer, can drop the mile close to 20 seconds.



CARLSON SHOWS SPEED OF THE MAXWELL

An effort was made to time a mile, but owing to the glittering sunlight reflecting from the snow-white salt beds, it was impossible to operate the flags with any degree of satisfaction, although binoculars and smoked goggles were used.

Tetzlaff's great drive of today, moreover, has demonstrated that the salt beds are as fast, if not faster, than the beaches on which all previous high-speed records have been made. In fact, it would not be surprising that soon salt-bed racing will completely displace beach racing. Ernie Moross, owner of the car which Tetzlaff drove, believes that the local course is faster than the Florida beach stretches and that the mile record can be clipped to 21 seconds. To put such a theory to a test, he plans to bring his string of cars here in the fall and again cast a blur of flight on the landscape.

The salt beds furnish a natural race course. They are as smooth as the proverbial billiard table and as hard as a cement highway. They are 60 miles long, 20 miles wide and from 2 to 30 feet in depth. The naked eye is unable to reach beyond the boundaries of this great expanse of white salt and only the distant mountain peaks show that there is really a continuation of the earth.

On this great expanse of salt a course was surveyed and marked by red flags placed 200 feet apart. Carlson and Tetz-

laff, piloting Maxwells, and D'Alene, driving a Marmon, first tried out the new course and all averaged better than 90 miles an hour. Then the mighty Benz was tuned up for the record-breaking attempt. At the outset, a gasoline feed line was broken and 30 minutes were spent in repairing it. Then Tetzlaff signaled the waiting flagmen and timers that he was ready.

As the big car thundered over the starting line with exhausts roaring, it sounded as if the United States had become involved in the European war and the artillery of the triple entente was at its

red work. So fast was the Benz going, that it was scarcely possible to distinguish driver and mechanic. For 1/2 mile, it was nothing but a white blur.

Small Cars Try Out Course

Not satisfied with establishing a new unofficial American record, Tetzlaff took the Maxwell and covered the 1/2 mile in 20 3/4 seconds. Billy Carlson made the best time for the lighter cars, traveling the distance in 19 3/4 seconds. D'Alene's Marmon was only 1/10 of a second slower.

Special trains were run from Salt Lake City to witness the trials and Governor William Spry of Utah was an interested spectator and took a spin over the sand with one of the drivers.

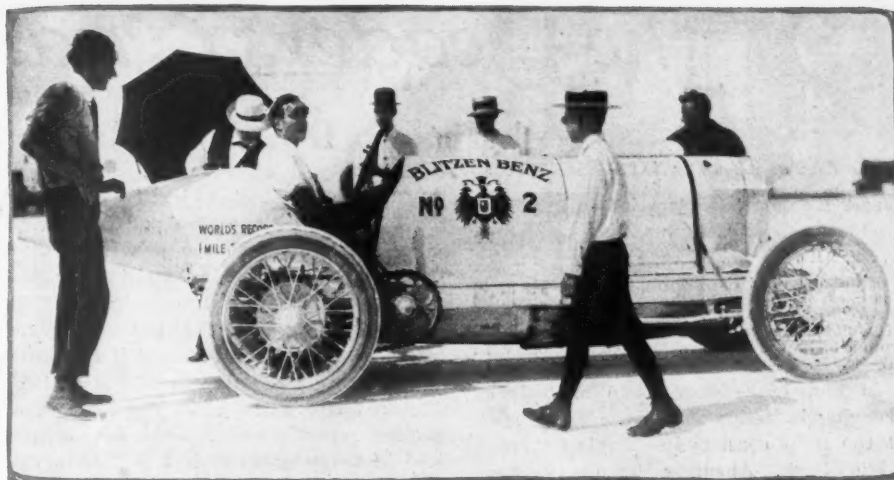
Local motorists are greatly interested in the possibilities of the salt beds for high-speed work and already there is talk of holding a race meet here in the fall. The drive was made in the interest of the Lincoln highway, Utah motorists desiring that the transcontinental route come through this part of the state.

RACE FOR ARGENTINA

Buenos Aires, Aug. 14—It has been decided that the grand prize of Argentina will be competed for January 3 to 10, and that it shall be a combination touring and racing event, over a total distance of 1,119.6 miles, the course being Buenos Aires, Rosario, Cordoba and return.

On the first day the contestants will drive to San Nicolas, a distance of 155.5 miles from here; January 4 they will drive from San Nicolas to Rosario, 124.4 miles; January 5 the route is Rosario to Belleville, 155.5 miles, and January 6 Belleville to Cordoba, 124.4 miles. The following day will be a day for rest and on January 8 speed trials, including the Argentina championship over a distance of 1 kilometer, will be held. January 9 the road race begins, the contestants having to drive to Rosario, a distance of 279.9 miles. On the next day they make the remaining 279.9 miles to Buenos Aires.

Only touring or stock cars may compete and they must carry at least two passengers—mechanic and driver—and be equipped as they are listed. Otherwise there are no restrictions.



TETZLAFF IN BENZ BEFORE UTAH SPEED TRIALS

House Committee on Patents Reports Oldfield Bill Approves Measure to Codify and Amend Laws

WASHINGTON, D. C., Aug. 15—Of vast importance to the motor car and accessory trade of the country is the action of the house committee on patents in reporting favorably the Oldfield bill to codify, revise and amend the laws relating to patents.

While the committee has acted favorably on the bill, it is understood that no action will be taken at this session but it is believed that at the short session, which begins in December, the bill will be pushed through by its author.

According to the committee: "The present bill is confined to three distinct abuses of the patent system: First, delayed applications in the patent office; second, the evils arising from the vendors of patented articles imposing on the purchasers thereof restrictions affecting the use of the articles, or the price at which they must be resold to the public; third, the evils arising from owners of patents suppressing the same or prohibiting their use in order to prevent competition with

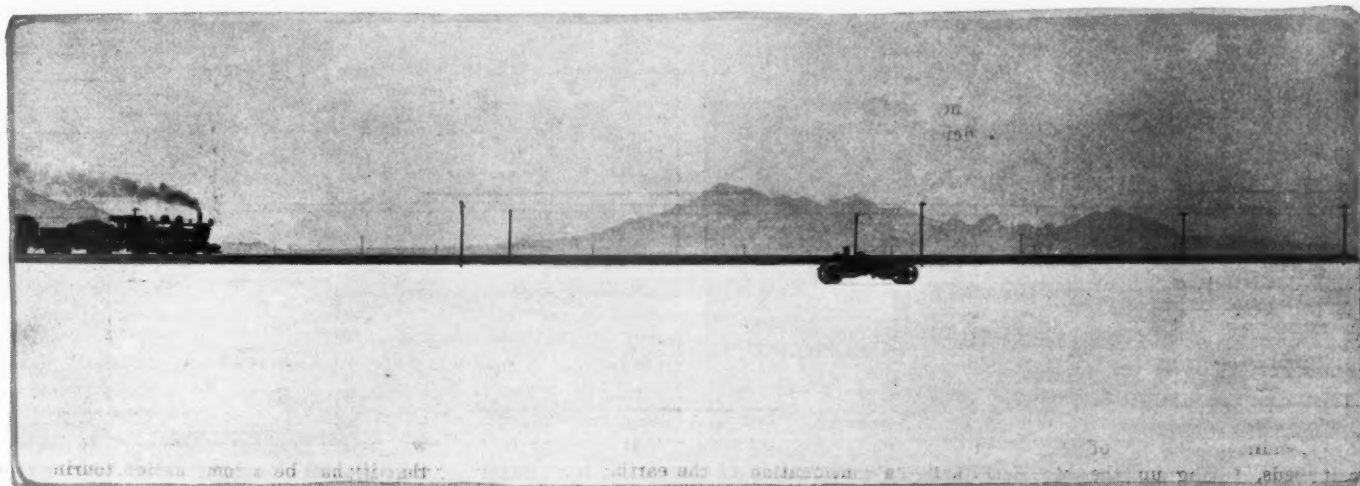
other patented or unpatented articles sold by themselves.

"Under the existing law an applicant can fritter away years in correspondence, each time delaying many months before replying to letters concerning trivial details. The effect of this is practically to prolong the duration of the monopoly. In some instances the preliminary proceedings have been drawn out over a course of 12 or 15 years.

"The telephone and motor car patents, both of which have a well-known judicial history, are notorious instances of this practice. Under the amendment now proposed this practice of delay will be eliminated. The applicant is allowed 2 years within which to present the merits of his claim to a patent. Certainly this is enough. When he files the application he is familiar with the merits or his invention as well as with the history of the art. In the course of 2 years, with reasonable diligence, he can present his case and answer the objections that are raised

against his application. Of course, the applicant ought not to be charged with any delay for which he is in no way responsible. Hence the time consumed by the patent office or by the courts or in interference proceedings is not to be computed as a part of the 2 years allowed to prosecute the claim.

"Another clause places patented articles on the same basis as unpatented articles with respect to the right to impose restrictions on their use or resale after the owner of the patent has disposed of them. This, undoubtedly, was the law as declared prior to the button fastener case in 1896. The committee thinks the exception there erected should be wiped out. The right to impose restrictions, or conditions as to subsequent use or resale, is no part of the patent grant. The restrictions are created by the contract and not by the patent law. The duty on the purchaser and the correlative right in the seller are contractual in origin and extent.



D'ALENE IN MARMON RACING WITH TRAIN ACROSS UTAH SALT BEDS



The Readers' Clearing House



TWO BATTERY CHARGING METHODS

Water Rheostat Construction—Lamp Bank Arrangement

JANESVILLE, Wis.—Editor Motor Age—Kindly give all the information possible as to how a 6-volt storage battery could be tested and charged and tools for doing same. I have a 110-volt direct current line. How many bulbs would have to be burned in connection with it?—O. H. Kruger.

In Fig. 1 are shown two methods of charging batteries at home. That shown at the right consists in charging through a lamp bank. About ten lamp sockets are fastened to a board and then connected in parallel. Carbon lamps of 110 volts are placed in the sockets. In series with the line is placed an ammeter, and across the line, as shown, a voltmeter is connected. A suitable switch is placed anywhere in the circuit. The number of lamps to be operated depends upon the charging rate of the battery. Let us suppose that the initial charging rate is 6 amperes. Either six 100-watt lamps will approximate this figure or about five 100-watt lamps and three 50-watt lamps. The ammeter will read the number of amperes being drawn by the lamp bank and if the charging rate is initially 6 amperes and the meter reads 7, then too many lamps are in the circuit and one at a time should be unscrewed until the meter reads 6 amperes. The illustration shows another method of charging at home, by the use of a water rheostat. This rheostat consists of a small barrel containing two lead plates and acidified or salt water. Each plate should be about 1 foot square and $\frac{1}{4}$ -inch thick. Such an arrangement may be used in a 110-volt circuit and the charging rate varied by the man in charge by bringing the plates closer together or separating them. In the latter case, the resistance is made greater and in the former less.

All makers issue instructions as to the initial and final charging rate for their

different types of batteries. In attaching the battery to the circuit care should be taken to see that the positive of the line is connected to the positive of the battery as shown. In charging by the gravity method you should consider that the specific gravity of the electrolyte varies as the temperature and if the gravity at 60 degrees Fahrenheit is to be 1.28, if the temperature is 70 degrees a correction must be made. Per every degree rise in temperature deduct .001 from the gravity of the liquid.

OPERATION OF VACUUM FUEL FEED

Fuel Fed by Gravity to Carburetor but Tank is in the Rear

Belmond, Ia.—Editor Motor Age—Explain the operation and mechanical construction of the vacuum fuel feed used on the Buick cars.

2—What is the gear ratio of the Buick C-37?

3—Will a six-cylinder motor throttle down to a lower speed than a four-cylinder motor?

4—Will a six-cylinder motor develop more horsepower than a four-cylinder motor of the same rating? That is, will a six-40 develop more power than a four-40?

5—Is it not a fact that cars equipped with good four-cylinder motors give better satisfaction than cars equipped with six-cylinder motors? Under tests of severe strain have not cars equipped with four-cylinder motors proven superior to six-cylinder motors of the same horsepower?

6—Will a four-cylinder motor stand the strain of a higher speed than a six under equal conditions?—A Subscriber.

The device is called the Stewart-Warner vacuum gravity feed from the fact the gasoline is drawn from the tank at the rear to the system by means of engine suction and is then fed to the carburetor by gravity. It consists of a small tank as shown in Fig. 3 placed on the motor side of the dash one lead D in the illustration running to the rear tank, another C to the intake manifold, and a third K to the carburetor. The small tank has two compartments, the upper one known as the filling chamber and the lower the reservoir. The upper one contains the float G which controls the valves A and B. The fuel in

the upper chamber flows to the lower compartment through the valve H. Engine suction draws gasoline into the upper chamber and when the float has risen to the top the suction is cut off and no more fuel flows. The fuel then drops to the lower chamber, where it is under atmospheric pressure and is fed to the carburetor. As soon as the float reaches its lowest position, the lever E is lowered so that it actuates the valve lever F, and this in turn closes the valve B against atmospheric pressure and again opens valve A, when the suction from the intake manifold again draws gasoline from the tank in the rear. The device makes it possible to place the tank in the rear of the car without adding an air-pressure system and forms a convenient fuel strainer, water and dirt being drawn off by the filter valve J.

2—The gear ratio of the Buick C 37 is 3.75 to 1.

3—In most cases a six will throttle lower than a four but under certain conditions of valve and ignition timing this may not be true.

4—It may or may not. Only an actual test could determine this.

5—It is not true that cars equipped with four-cylinder motors give better satisfaction than sixes. There are any number of cars owners who obtain more satisfaction from sixes than from fours. All depends upon the car and the driver and the care given the machine.

6—The question is too broad. The only way it can be answered would be to take two motors one a four and the other a six and compare them by actual test.

ADJUSTING COLE STEERING POST

Method of Taking up Play in Various Parts Given

St. Louis, Mo.—Editor Motor Age—Kindly explain how to take up play on the steering

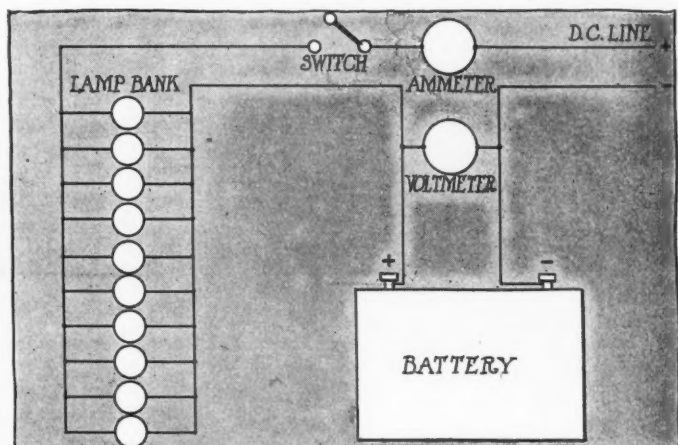
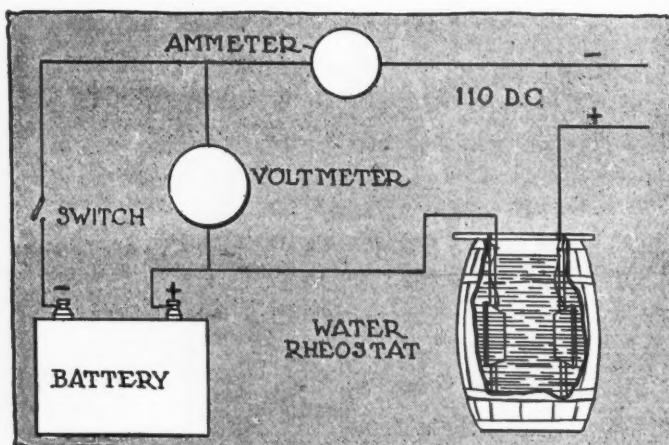


FIG. 1—TWO METHODS OF CHARGING BATTERIES AT HOME

At the left is shown the water rheostat for controlling the flow of current. It consists of a barrel with two lead plates which are moved toward or away from each other as conditions dictate. The right illustration shows the lamp bank method

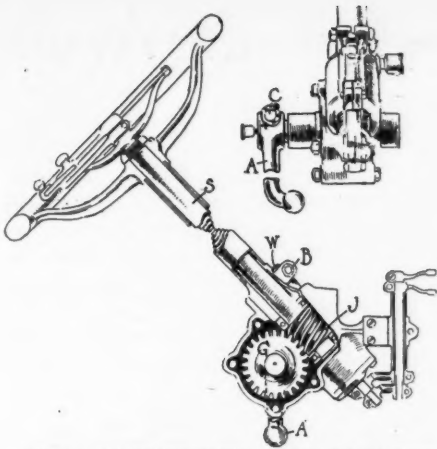


Fig. 2—Adjusting points on the Cole 50 steering post. The text tells how play is taken up in all the working parts

gear used on the model 50, Cole 1913.—A. E. Graf.

The steering post and mechanism of the Cole model 50 is shown in Fig 2 and in order to remove up and down play in the post S or the worm J, the clamp bolt B should be loosened and the worm adjusting nut W screwed downward. If the gear has had hard usage and the worm threads are worn excessively or the worm gear G is worn, it is suggested that the ball arm A be removed and the worm wheel turned one half revolution in either direction. This causes new teeth to be in engagement. In replacing the ball arm it will be necessary to file a new notch on the end of the worm wheel shaft, the new notch being needed for the clamp bolt C and the arm A.

MOTOR HAS LITTLE COMPRESSION

Cylinder Leaks, or Poorly Timed Valves Probable Causes

Watertown, Wis.—Editor Motor Age—Kindly tell me what is the trouble with my 1909 Jackson, which will not fire regularly on the rear cylinder. I have had the valves ground, the carbon removed, new piston rings fitted, still there is no compression on the rear cylinder.—Knospe Brothers.

The poor compression may be due to improperly adjusted or poorly timed valves. This is a common cause and very often after grinding the operator forgets to readjust the tappets. Cylinder leaks may be causing the trouble. Perhaps the leak is around the spark plug or the cylinder plug openings. A little paste stove blacking on the threads will prevent leaking at these places. Do not use too much of the paste but just enough to cover the

threads lightly. The piston rings ends may be in line and thus cause the gas to escape in the lane made by the rings. The piston itself may be loose or the cylinder worn a little oversize.

His Car Has Troublesome Rattle

Martin, Mich.—Editor Motor Age—I have a 1912 model 59 T Overland which has a rattle which cannot be located. It sounds as though it were at the front end. The bearings have been tightened and I have even looked in the gearing that runs the magneto but have been unable to locate this.—S. Bender.

The rattle may be due to a loose mud pan, or to a loose cooling fan. If the motor has a Gray & Davis system it may be caused by the chain drive being slightly loose. It is adjustable and the slack should be taken up. If you will give Motor Age a better diagnosis perhaps more may be said. Give the exact nature of the sound and tell whether it appears to be internally or externally of the motor.

FINDS FAULT WITH RADIATORS

Says Filler Cap Location on Some New Cars Is Disadvantageous

Boston, Mass.—Editor Motor Age—I note a new construction appearing in the announcement of the 1915 models, namely, radiators without conventional water-filler openings. Undoubtedly, any innovation looks strange at first, just as did left-hand drive fore doors, wire wheels, etc. Outside of the freakish air-cooled appearance of these new radiators, it seems to me that there are distinct disadvantages. First, the radiator filler opening is under the hood, requiring that the hood be lifted every time the radiator is filled or examined. In one case the magneto is directly beneath this filler opening, insuring a bath of water for the magneto every time the radiator is filled. Second, an offset filler spout is used making it absolutely impossible to see the water level unless the radiator is full to the neck. Third, to put water in, one must reach over the mud guard, insuring soiled clothes from the mud guards, which always gather a slight amount of crude oil from the road.

In a summary of the no-filler radiator, I can only see the one possible advantage, that no rusty water gets on the radiator if the car overheats. However, I am of the opinion that a well-fitted radiator cap will always take care of this contingency.—G. M. Faulkner.

GRAPHITE AS A MOTOR LUBRICANT

Kind and Quantity to use—Has Electric Starter Trouble

Stow, N. Y.—Editor Motor Age—One of the cylinders on my Overland model 79-T leaks and carbons in a short time. Can Motor Age suggest a remedy for this?

2—Is it a good plan to use graphite in the oil? If so, what amount, form and grade should be used?

3—I have had some trouble with the starter. It does not seem powerful enough to turn the engine over. The batteries have been tested and everything has been looked over, but nothing can be found which would cause this.—M. Butts.

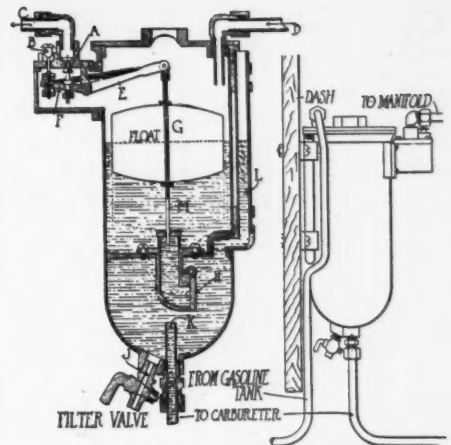


Fig. 3—The construction of the Stewart-Warner vacuum gravity feed which feeds fuel to the carburetor by gravity even though the gasoline tank is in the rear of the chassis

1—The carbon deposit is the result of burning oil and the remedy lies in preventing too much oil from getting above the piston top. Poorly fitting piston rings will cause this and a loose piston or a worn cylinder will give the same result. The crankcase level should not be kept too high.

2—Graphite is an excellent lubricant and the ordinary flake graphite can be mixed with cylinder oil and good results obtained. The Dixon company, Jersey city, N. J., recommends a mixture of 5 per cent of its motor graphite known as Ticonderoga with 95 per cent cylinder oil. The best results are obtained when the graphite is fed to the oil a little at a time. Instead of mixing the entire 5 per cent, first mix 2 per cent and then 1 per cent every 5 days perhaps, until the entire quantity is in the oil. The International Achison Graphite Co., Niagara Falls, N. Y., makes what is called deflocculated graphite which is a suspension of graphite in oil. This is used in the same way as cylinder oil. In buying graphite you should state specifically that it is for a motor car engine.

3—If the battery is in good condition the trouble is clearly between the battery and starting motor or in the starting motor itself. The battery gravity should be tested, for a voltmeter sometimes is inaccurate. The gravity of the average make is 1.28 when fully charged. Look over the switch and all wiring between battery and motor, see that there are no insulation breaks. If the battery is in good condition, and the wiring found to be in fair shape then blame the cranking motor but under no circumstances should you attempt to dismantle it to look for the trouble. Let the maker do the work.

Brake Horsepower of Motors

Spring Grove, Ill.—Editor Motor Age—What is the brake horsepower of the Overland, Krit and Ford?

The cars you name with the b.h.p. of their motors follows: Overland, 35, at 1,800 r.p.m.; Krit, 21.7, at 1,225 r.p.m.; Ford, 20, at 1,400 r.p.m.

Questions Answered and Communications Received

O. H. Kruger.....Janesville, Wis.
A Subscriber.....Belmond, Ia.
A. E. Graf.....St. Louis, Mo.
Knospe Bros.....Watertown, Wis.
G. M. Faulkner.....Boston, Mass.
M. Butts.....Stow, N. Y.
G. L. McNaught.....Virden, Ill.
S. Bender.....Martin, Mich.
A Reader.....Spring Grove, Ill.

No communication not signed with the reader's full name and address will be answered.

Six Years of Preparation Motorizes German Army

Fatherland Long Ago Recognized Utility of Gasoline in Wartime

By Marc Braun

GERMANY now is engaged in a colossal war for which she has been preparing since the peace treaty, ending the Franco-Prussian war, was signed. Even her opponents will admit that her preparations have been systematic and thorough. Her hordes of soldiers have been carefully trained, thousands of marks added to the war chests annually, plans laid for campaigns against her rivals.

Germany, moreover, has prepared for a modern war, a war fought in the air and a war in which gasoline will play an important part in moving troops and provisions. Six years ago, March 31, 1908, the German government started to lay plans for the transportation of soldiers and supplies by passing a law granting subventions and premiums to German manufacturers and business men for motor trucks, with or without trailers, which would be suitable for military purposes.

According to the official records made public, 825 motor vehicles, with or without trailers, either have been taken into service or requested for future service by the war department within a period of 5 years, ending March 31, 1913, and have become subventioned vehicles, while there were 400 more vehicles throughout the empire which came up to the military requirements but which had not been allowed a subvention or premium. Thus at the end of March, 1913, the German war department had all told 1,225 motor vehicles at its disposal.

Regulations Very Strict

The regulations governing the subvention are very strict. In the first place they apply only to German-born citizens, residing in Germany, or if residing outside of the empire, they must be recorded with some German association or board of commerce and indicate very exactly the reasons why the individual resides abroad or outside of German territory.

The vehicles are divided into two classes—those called army trains, consisting of a truck having one or several trailers, and those called ordinary trucks. To be accepted by the war department, the trucks of the first class, when fully equipped and fitted, with two men aboard, must be able to carry a load of 8,800 pounds and pull a trailer having one man aboard and carrying a load of 4,400 pounds. They must be able to climb roads having a grade of 1 to 7, when thus fully loaded. Under no circumstances must the vehicle be able to travel over 10 miles an hour. Trucks and trailers must have rubber tires. The trailer must not weigh over 5,500 pounds and must carry a load of at least 4,400 pounds. Its total weight when loaded must not be over 16,500 pounds.

Trucks, without trailers, when fully

loaded, must not weigh over 19,800 pounds. The weight upon the rear axle must not be over 13,200 pounds, and the pressure or weight upon .393 inch width of the rims must not be over 330 pounds.

The owner of an "Armee Lastzug" or army train-truck with trailer, when the latter has been accepted by the government, receives a subvention or bonification of \$750, and an annual premium of \$300 during the second, third, fourth and fifth year, while the owner of an ordinary "Lastwagen" or truck receives a subvention of \$450 and an annual premium of \$200 during the remaining 4 years.

Trucks Have Withstood Test

Military experts have stated that fully 40 per cent of all vehicles submitted or which have been operated by the war department, were still in excellent condition at the end of the fifth year and that at the end of the sixth year 30 per cent were still apt to be of good service for the war department.

One feature about the selection of motor vehicles for the war department is that only such machines are taken into consideration whose manufacturers are in a position to give all the needed aid, materially and otherwise, to the war department. Thus only the big or more important German manufacturers are on the list, as will be noticed from the accompanying table which gives the number of vehicles subventioned each year.

Name of Vehicle	1908	1909	1910	1911	1912	1913	Total
Daimler	61	46	19	23	16	165	165
Bussing	50	29	20	22	16	137	137
N. A. G.	25	27	19	21	16	108	108
Benz	20	22	18	24	19	103	103
Mannesmann-Mulag	6	11	12	9	9	47	47
Durkopp	12	9	9	9	9	39	39
Eisenach-Dixi	11	9	7	9	9	36	36
Norddeutsche Lastwagen	7	9	11	9	9	36	36
E. Nacke	10	9	6	5	30	30	30
P. H. Pödeus	3	6	5	5	19	19	19
Stoewer	4	7	6	5	17	17	17
Ehrhardt	4	5	5	5	14	14	14
Deutsche Last-Auto	9	12	7	2	5	7	7
Ansbach	9	12	7	7	7	42	42
Joseph Rathgeber	10	5	5	5	5	25	25
15 Manufacturers	175	207	152	156	135	825	825

It is not surprising that the Daimler Motor Gesellschaft occupies the first place on the list and that its vehicles represent 20 per cent of the total contributed by fifteen manufacturers of heavy motor cars. The Daimler company has been one of the first in all Europe to make vehicles which might be used for military purposes. Bussing which is next on the list comes in for 16.6 per cent in the number of cars. He is one of the veteran motor car makers in Germany and has made commercial and utility vehicles only.

The government records also show to what usage, or rather in what different

industries or trades, the 825 army vehicles were employed. Thus it is shown that 41.7 per cent were used by breweries, 20.8 per cent by general merchandise houses, such as wholesale grocers and importers; brick manufacturers used 8 per cent, flour mills 6.4 per cent and builders of agricultural instruments or harvesting machines 4.1 per cent. The following table shows the businesses in which trucks were used which were subventioned by the German government, during 5 years to March 31, 1913:

Business	1908	1909	1910	1911	1912	1913	Total
Breweries	93	66	60	58	63	340	340
Gen. Mdse.	33	57	29	34	19	172	172
Brick Makers	9	12	15	17	13	66	66
Flour Mills	8	17	8	7	13	53	53
Agricultural Instrument Makers	5	11	10	5	3	34	34
Building Material	4	8	9	8	8	37	37
Iron & Steel	7	3	6	7	6	29	29
Stone	3	12	7	5	2	29	29
Coal	5	1	5	4	2	17	17
Shippers	4	4	2	9	6	25	25
Printers	2	4	1	2	6	6	6
Paper Mfgs.	2	4	1	2	9	9	9
13 Trades	175	207	152	156	137	825	825

WAR ON CURB FUEL STANDS

Detroit, Mich., Aug. 16—Basing his contention upon the fact that the supreme court of the state of Michigan recently decided that the city had a right to remove from the streets or sidewalks all obstructions, Commissioner of Public Works George H. Kenkell of the city of Detroit has sent a notice to all proprietors of gasoline stands or stations which have curb or sidewalk stands, that they will have to remove them by October 16.

There are more than 100 such stands throughout the city territory and there is no doubt that the matter will be taken up to the courts for a test case within the next few days, according to an official of one of the local companies.

"If this gasoline pumping outfit which does not take up more than a few inches of space must be removed, then every electric lighting post, every police-calling box, in fact everything which is fastened upon the sidewalk or street must also be removed," said an official of a gasoline supply station on Jefferson avenue. "I think it really is not the intention of the city to do any such a thing as it will mean thousands and thousands of dollars lost to the gasoline supply stations for the removal of their gasoline tanks and pumping instruments and their installation, if possible, somewhere else. It is just because these stations have no other way to supply the trade that they installed these curb and sidewalk pumps. They could not do business otherwise as they have no garage or a place into which the motor cars could be driven. In other words it would mean the driving out of business of many of us."



The Motor Car Repair Shop



IN this department last week there were shown two methods of converting a motor with two sets of valves into one with three sets, one acting as intake and two as exhaust. A good example of the practicability of such a scheme is shown in the illustrations herewith which are of a 1903 Mercedes motor converted so that there are now two sets of exhaust valves and one set of intake. The transformation is due to the efforts of Mercedes Fritz Walker, once mechanic for Fox-all Keene and now driver of the rebuilt Mercedes in the Elgin races.

In the Mercedes design the cylinders are of T-head construction with a flat plate on the inside of the cylinders underneath the water-jacket space. This plate is removable and in the reconstruction advantage was taken of that fact. As will be seen from the illustration in Fig. 2, the extra set of valves is placed over the water jackets thus requiring that the jacket be sealed around the new set of valves, and at the same time affording a means of efficiently cooling the valves. As shown in Fig 1, the webbed valve guide casting serves as a means of blocking the water jacket space. These castings are threaded into their respective places and the valves then placed in the guides from underneath. The exhaust header is in the form of a large casting made of macadamite. This casting has but a single opening to send the exhaust gas to an outlet pipe. The casting is held in place by the valve springs. The overhead casting also serves as a means of attaching the rocker arm supports.

The operation of the extra set of valves is made possible in this job by a double camshaft. Previously this shaft served only to operate one set of exhaust valves

Reconstructing Old Motors

but by pinning an extra set of valves upon the shaft and changing the upper portion of the crankcase, the overhead valves also were controlled. Mercedes Fritz has installed the engine in a car and expects to travel 100 miles per hour.

Electric Equipment Troubles

The majority of electric troubles are due primarily to improper care given to the battery. The maker of the accumulator issues instructions regarding the battery and if these are not lived up to, trouble

and motor which includes the switch and trouble in the cranking motor itself. The electric motor, like a fan motor gives little trouble. Every one knows that the office fan can be operated for years without being in the repairshop once. The cranking motor of the car is equally as serviceable unless tampered with. Oiling of the motor bearings should be the only care necessary. The battery, however, needs a little more attention and the S. A. E. standard rules are familiar to everyone. Sometimes an owner will depend entirely upon a dash voltmeter or ammeter or some form of pocket meter for determining the condition of the battery. Such instruments, while of value, should not solely be depended upon to tell battery condition. The only safe way of telling the condition of the battery is to use a hydrometer. Switch and wiring troubles are frequent. Often the cable insulation is broken down or there is a short or open circuit in the switch. All these things must be looked after before the cranking system is condemned. The lighting generator and its auxiliaries, such as regulator and cutout, may require more care than the cranking system. The generator brushes require trimming periodically and the cables often need to be refastened. When it comes to regulator and cutout trouble the novice owner should not attempt the repair of the parts himself. The adjustments, while not delicate, require a clear understanding of electrical apparatus.

Quieting Gears

When timing gears or gearset or rear axle gears become noisy and there is no means of adjustment, the use of graphite will be helpful. Many owners resort to the method of using ground cork or sawdust with heavy oil.

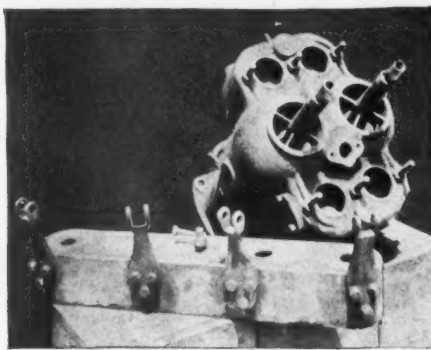


Fig. 1—The above illustration shows how the valve stems are constructed in the 1903 Mercedes motor. The webbed portion is threaded into the space formerly used as a water jacket space. The water now circulates around the extra valves

will result. Recently a number of inquiries have come to Motor Age and in nearly every case it was a clear example of battery trouble. When the starting motor acts sluggishly there are three possible causes of the trouble—failure of the battery to deliver the proper amount of current, wiring trouble between battery

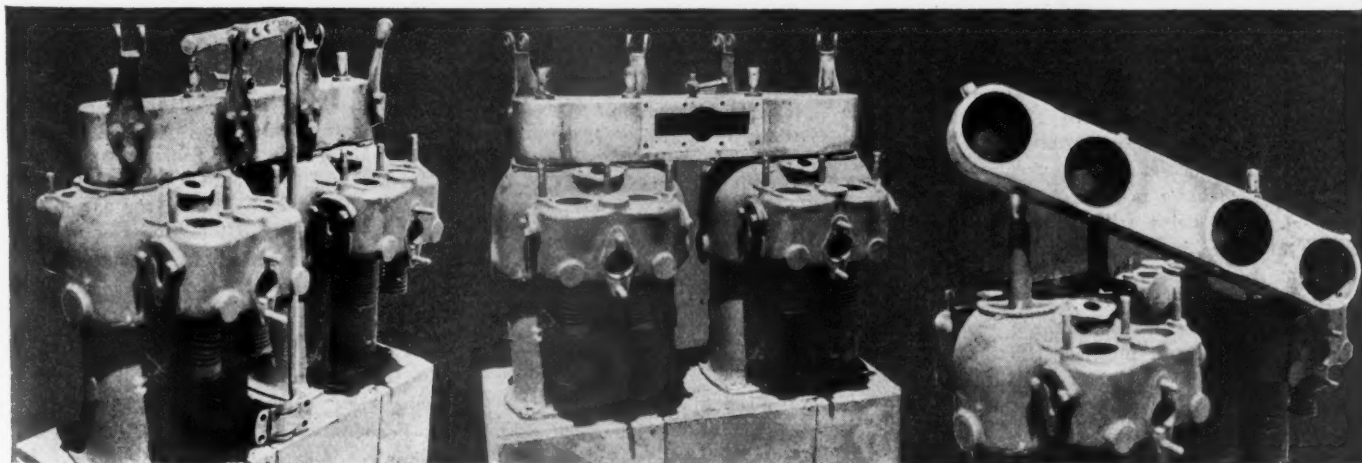
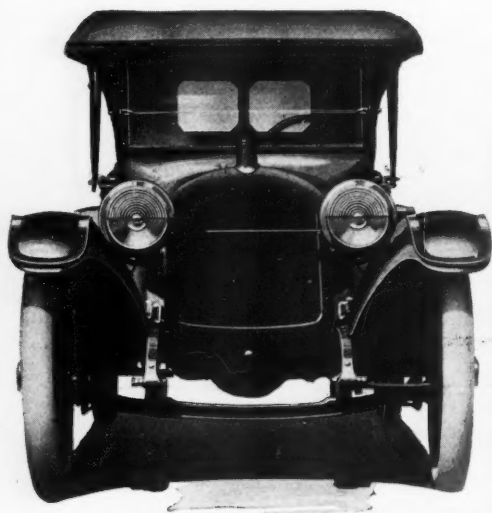


FIG. 2—DETAILS OF RECONSTRUCTED MERCEDES MOTOR

The illustration at the extreme left shows how the extra casting has bolted to its supports for the valve rocker arms. An arm and its lift rod are shown in position. The center view shows the casting with its single opening to which the exhaust pipe is attached. The right illustration shows the bottom of the casting

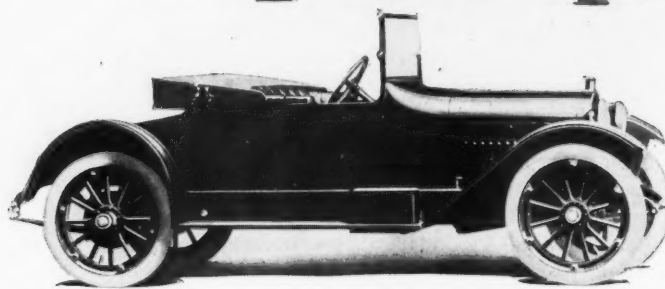
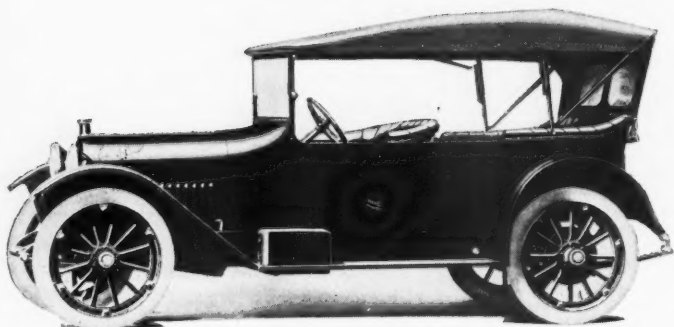
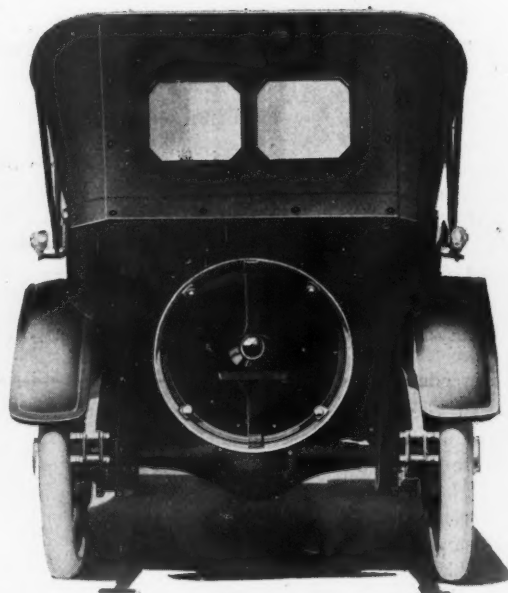
Hupmobile Brings Out More Powerful Redesigned Car

New Streamline Body—Price is \$1,200—Altered Throughout



FEATURES OF THE 1915 HUPMOBILE

*New price is \$1,200
Wheelbase is now 119 inches
Left drive and center control
New type of frame
Entirely new rear and front axles
Atwater Kent ignition adopted
Single unit Westinghouse system
Carburetor control is unique
Motor parts larger and stronger
Bore increased $\frac{1}{8}$ -inch to $3\frac{3}{8}$
New streamline body*



The upper illustrations show a front and rear view of the 1915 Hupmobile, which is practically a new car. The front view shows the new type of corrugated headlight lens. The two lower illustrations show the new touring and roadster bodies on the Hupmobile chassis

IN presenting its 1915 model the Hupp Motor Car Co., Detroit, Mich., offers the model K which is an entirely redesigned car selling at \$1,200 and there is hardly one feature remaining unaltered. The new model is much better in appearance than the 1914 car, it is larger both in body and chassis essentials, it is more powerful and heavier by some 300 pounds.

Radical Reconstruction

To take care of the larger power plant and bigger body, the wheelbase has been changed from 106 inches to 119 inches, and in making this chassis change several features that were formerly peculiar to Hupp practice have been radically reconstructed. Left drive with center control is one of these innovations and another which marks a difference between the car of today and the previous ones of Hupp design is the use of semi-elliptic underslung rear springs in place of the former cross rear springs. In changing the suspension the entire framework of the chassis is new and this in turn has been the cause of alterations in the linkages, brakes and control members.

While many of the fundamental features of the motor design remain the same, the bore has been increased $\frac{1}{8}$ inch,

the water jackets are larger and the valve diameters increased. The connecting rods are longer, all the bearings larger, with wider ports and an entire change in the manifold design. The carbureting system is also new in that it now preheats the air by means of exhaust heat. While the Zenith carburetor is still employed, it is now the horizontal type instead of the vertical and is now a $1\frac{1}{4}$ -inch size in place of the 1-inch formerly used. A new method of carburetor control has been adopted.

The electrical equipment of the car has also been entirely redesigned. As in its predecessor, the new car employs the Westinghouse electric lighting and starting system, but instead of using the double unit system the cranking motor and the lighting generator are now combined into a single unit. Instead of using magneto ignition, an Atwater Kent distributor driven from a vertical shaft and supplied with automatic advance, has been fitted. With the application of the new distributor many other exterior fittings of the motor have been altered. There is a new fan bracket which maintains a continuous tension on the fan belt by means of a coil spring.

In rearranging the motor, the drive of

the camshaft has been moved from the rear to the forward end. The oil filler has been moved back to accommodate the new position of the carburetor and while the oiling system itself has not been altered as far as the motor is concerned, it no longer takes care of the gear box. The object has been to arrange it so that heavier oil can be employed for a gear lubricant. Instead of the gearset being a unit with the crankcase it is now bolted on separately, making a more accessible job as far as reaching the gears in the gear-box is concerned. Large cover plates are now placed over the gearbox and clutch housing and the oil filler opening projects through the floor boards of the car so that the driver may refill the gearset without lifting these boards, but by merely picking up the cover off the floor board.

Clutch Action Changed

The clutch is the same in principal as in the last model, but has been turned completely around, the purpose being to put the thrust drag on the gearset rather than on the motor when slipping the clutch. The diameter of the clutch remains the same at 13 inches but the number of plates in the clutch has been increased by four. There are now thirteen.

Just back of the clutch there is a new chassis frame member extending transversally, which acts as a stiffener and which carries the pedal shaft for the brakes and clutch.

While the shaft system of drive is practically the same, there are now two universals, one at either end of the shaft, whereas in a former model there was but one. The rear universal which has been added is a cross type. The propeller shaft



The two engine views shown above give a clear idea of the way the carburetor is controlled on the 1915 Hupmobile. Note how the control rods extend from the steering post over the motor to the carburetor

is now tubular and the lubricant from the forward universal is allowed to run back through the hollow shaft to the rear universal. There are now no radius rods or torque members, both the drive and torque being taken through the new springs.

The entire rear axle is new. In former Hupp cars when it was desired to reach the differential it was necessary to remove the bolts from the vertically split housing and to take the entire housing apart. There is now an exceptionally large circular cover plate which when removed exposes the entire differential and drive mechanism. The ratio of the final drive has also been altered and is now 4.25 to 1. The front axle is also entirely new and is now the Elliott type with a knuckle which is designed to give a castor effect to the front wheels.

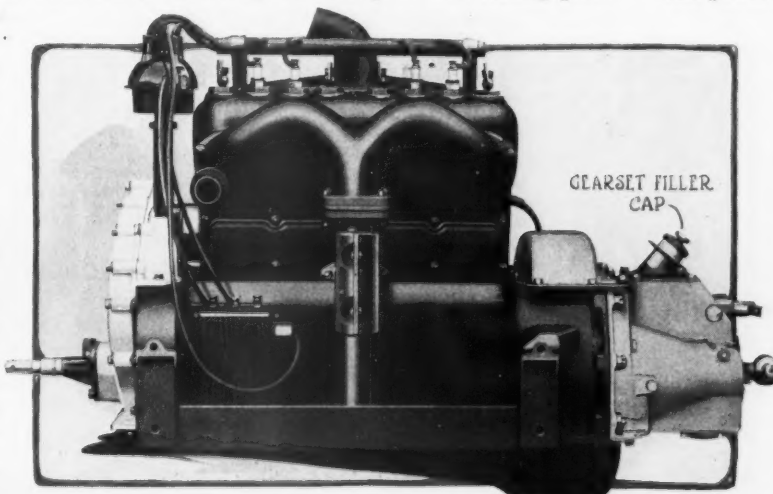
Springs Altered

In altering the spring design attention has been given to the placing of grease cups on all spring connections. There is also an inter-leaf oiling scheme which is new. In the extremity of each leaf there is a spoon-shaped depression which is packed with graphite. This scheme has been originated by the Detroit Steel Products Co.,

and by its use the lubricant is being inserted between the spring leaves but once in a season.

Larger Steering Wheel

The same steering gear is used as in the previous model but the steering wheel is now 18 inches, whereas it was formerly 17 inches. The arrangement of levers on the top of the steering wheel and the linkage in transmitting the motion to the throttle and air control of the carburetor is entirely new. There is no spark lever as the Atwater Kent system includes an automatic advance. There are two levers, however, on the top of the steering post.



Intake side of the Hupmobile engine showing the oil filler cap for the gearset and the neat appearance gained by placing the carburetor on one side and intake manifold on the other

One of these is the ordinary hand throttle lever and the other operates in conjunction with a flap air valve on the new Zenith carburetor. When moved over in one direction it cuts off the entire air supply of the carburetor, furnishing the rich mixture required for easy starting. When moved to the other extremity it opens to the outside air, permitting of extra air for high speed work.

The wheels are larger than they were last year. The tires are now 34 by 4 inches, whereas on the preceding model they were 33 by 4. The tire carriers are the same on the touring car but on the roadster they are now carried under the rear deck. Various little details increasing the comfort in the operation of the car have been made a subject of study. An example of this is in the pedals, which are now adjustable and which are provided with exceptionally large foot pads. There is now also a side support for the foot in operating the accelerator pedal. Owing to the reversal of the clutch the leverage is fully 50 per cent less than it was in the former model.

New Streamline Bodies

It is in the body work that the changes appear most radical to the eye. Instead of the somewhat distinctive straight-line bodies of the 1914 season Hupmobile bodies are now of full-molded streamline construction. The sloping hood and cowl form a continuous curve which is not terminated at any point on the body but which is swept directly to the rear end of the car. A new radiator which makes a more fitting entrance of the streamline form and which at the same time gives a gain in capacity of 2.5 gallons, by the use of hexagonal in place of square cells, has been fitted.

Two standard types of body will be fitted, the roadster and touring. The price of each is \$1,200, fully equipped. The standard colors are blue-black bodies with maroon running gear and nickel trimmings. The cars come fully equipped with a new design of one man top, and a new type of rain vision windshield.

The power plant of the Hupmobile is a four cylinder, 3 $\frac{3}{8}$ by 5 $\frac{1}{2}$ -inch motor, with the cylinders cast in block. The increase in piston displacement on this new motor has been from 182 $\frac{1}{2}$ cubic inches to 196.8. The cylinders are still offset $\frac{5}{8}$ inch. This motor has a compression of 75 pounds gauge. Pistons are gray iron and carry three diagonally-split rings. The piston pins are of steel, hardened and ground and clamped in the connecting rod, turning in the bearing formed by the piston boss. The piston pins are hollow.

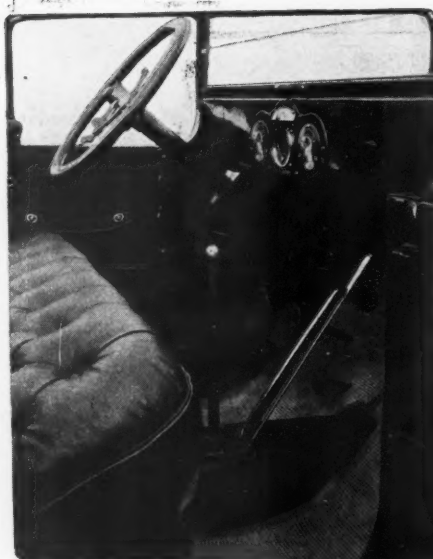
Connecting rods are drop forged, heat-treated of

acid open-hearth steel. The bearing caps are fastened by $\frac{1}{4}$ -inch nickel steel bolts, secured by cotter pins. All the crankshaft bearing surfaces are ground and the three bearings are of generous length. The front bearing is $2\frac{1}{2}$ inches long and $1\frac{1}{8}$ -inch diameter, the center bearing 2 inches long by $1\frac{1}{8}$ -inch diameter and the rear 3 inches long by $1\frac{1}{8}$ -inch diameter. All the crankshaft bearings carry phosphor bronze bushings lined with babbitt, machined and reamed in place with a final hand fitting. The bearing bushings are split and can be adjusted by removing the pan on the bottom of the crankcase. The crankcase is a modified barrel type.

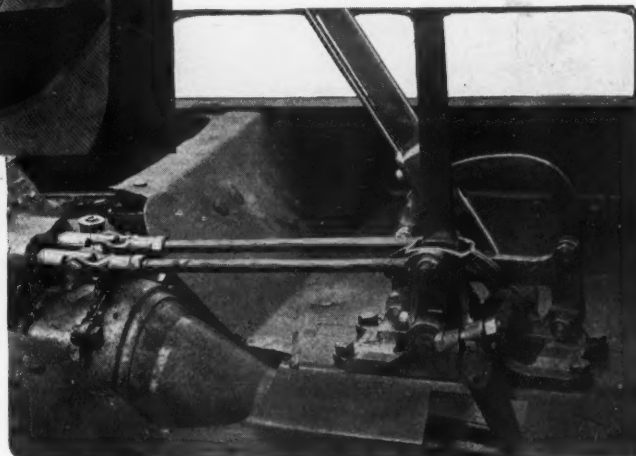
Silent Chain Camshaft Drive

The camshaft is driven by Coventry silent chain at the front end of the motor. It can be adjusted for tension without removing the chain cover. The camshaft is also carried on three phosphor bronze bearings. The valves have a clear diameter of 1.15 inches. They are forged in one piece from tool steel that will remain hard at red heat, it is claimed. The Hupmobile engineers claim this type of valve will seldom if ever require regrinding. In place of the cover plates which were formerly used over the valves there are now screw plugs. The followers which are actuated by the cam are of the mushroom type. The chamber which contains the valve springs is inclosed within an oil tight cover so that the contact between the valves and the tappets takes place within an oil bath.

The oil is circulated by the flywheel. The flywheel rim is close to the bottom of the oil can at its deeper part and the oil that adheres to the flywheel is carried around with it and thrown with considerable pressure, due to the centrifugal force of the flywheel, into a tube from which it is carried to the different working parts of the motor. The face of the flywheel in the new motor is very much wider than that of the previous model and hence a larger volume of oil is forced through a pipe of the same diameter, increasing the pressure and giving much better lubrica-



The 1915 Hupmobile uses left drive and center control and the two illustrations herewith show the new position of the control members and how the operating rods extend into the gearset



tion at high motor speed. This year the oil leads to the cylinders have been done away with, as experiments have shown that sufficient oil from the cylinders is thrown from the crank end bearings in the form of mist.

Changes in the Clutch

As mentioned, the clutch acts in the exact opposite direction from that used on a former model. That is, the friction on the clutch thrust is taken by a bearing in the gear box instead of the motor. The thirteen disks are of hardened saw steel 13 inches outside diameter and $\frac{1}{8}$ inch thick.

Outside of separating the gearset from the engine, it remains the same as in the previous car. It is a selective sliding

type furnishing three forward speeds. The small gears are of nickel steel and the large gears acid open hearth. The gears are heat-treated or case-hardened according to the requirements of their carbon content. The bearings of the gearset are annular balls and the front bearing, which is made of extra large diameter, not only carries the gear load

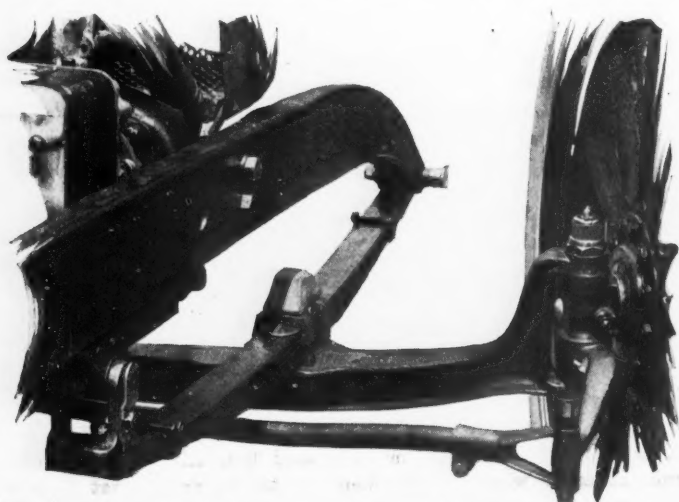
but also is the bearing that takes the thrust of the clutch. This is a new feature in this model. The diameter of the gear shafts is 1.25 inches and they operate on four integral keys. This year the gears are run in heavy grease, whereas in all former cars they were oiled by a cylinder lubricant.

The rear axle is a floating design. Either axle shaft may be withdrawn from the housing without jacking up the wheel. The casing is of pressed steel with the gears and differential mounted in a malleable iron carrier. The differential is a bevel

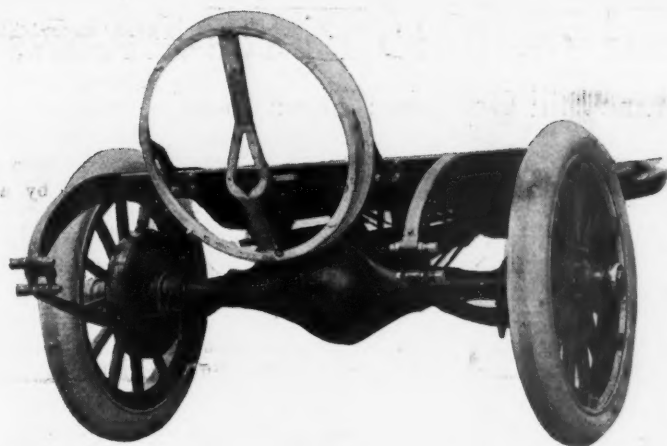
type running on annular ball bearings. It has four pinions. In adjusting any of the mechanism of the rear axle an accessible arrangement has been provided by means of which either the entire differential, together with the bevel pinion and gear or the large gear in the differential, may be removed as a unit. In redesigning the axle a new exterior appearance is given by the use of hub caps instead of the flat plate on the previous model. These hub caps, with the larger wheels and altered rear spring design give a much different appearance to the back of the car. Each artillery wheel is carried on a double annular ball-bearing designed to take the radial load only. The axial thrusts exerted when the car is running in ruts or when there is any tendency to tip the wheel are taken by the axle drive shaft, which is 1.275 inches in diameter. This is .25 inch more than in the previous model. The connection between the driving flange and the axle shaft is by a keyed taper fitting, which is drawn tight on the taper by a large nut. Four integral keys on the inner end of the shaft transmit the drive. The brakes act on the rear wheel drums and are 14 by 2 inches. The front springs are 37 by $1\frac{3}{4}$ inches, which is 3 inches longer than in the former Hupmobile and the new semi-elliptic rear springs are 52 by 2 inches in length and are shackled to an up-swept portion of the main frame.

Additions to Equipment

The equipment of the car is exceptionally complete this season, and in lighting and starting has been redesigned. It is



The new Hupmobile front axle is of the Elliott type. The front springs are 3 inches longer than those of the 1914 model



Rear suspension of the Hupmobile is now by semi-elliptic underlugs springs. The entire rear axle is new and differential inspection and adjustment is made easy by removal of the plate shown

the Westinghouse 12-volt type, 12 volts being used both for starting and in each of the lamps. Non-glaring headlights, in which the upper part of the front lens is corrugated, are now employed. The tail-light has another exclusive feature in that it illuminates the road behind the car.

The electric starter is at the front right end of the motor and is connected directly by silent chain giving a ratio of 2.64 to 1 to the crankshaft. Turning a switch lever on the dash starts the engine and at the same time closes the ignition circuit. As soon as the speed increases to a point where the car would be traveling nine miles an hour on high gear, the electrical unit becomes a generator and starts charging the battery. At about 18 miles per hour the maximum charging rate of 8 amperes at 14 volts is reached. The motor can never stall for should it cease to operate, merely depressing the clutch pedal, will cause it to be started again. The timer for the Atwater Kent system is driven by spiral gears from the front end of the camshaft.

The Westinghouse system is now included as stock equipment on all cars. There are also the headlight dimmers, license brackets, rain vision windshields, silk mohair top, speedometer, robe rail, foot rail and cocoa mat included with the car. The rims are demountable and one extra rim and tire carrier is furnished. The weight of the car when fully equipped and with the tanks empty is 2,650 pounds.

LOCATES PLANT IN DECATUR

Decatur, Ill., Aug. 17—The Olmstead Gas Traction Co. of Great Falls, Mont., purchased the plant of the Curtis Truck and Forging Co. of Decatur this week and shortly will commence the manufacture of four-wheel-pull gasoline tractors for road and farm work of all kinds. Due to the heavy freight charges from Montana to the middle states, the company felt the necessity for an eastern plant and decided to locate in Decatur.

JEFFERY TO RAISE FOUR'S PRICE

Kenosha, Wis., Aug. 17—Announcement has been made by the Thomas B. Jeffery Co. that within the next 90 days an in-

crease in the price of the Jeffery four will be made public. This car was listed from the time of its announcement, about the first of the year, until August 1, at \$1,550. At that time, simultaneously with the announcement of the Jeffery Chesterfield six, the price of \$1,450 was decided upon. No details have been made public by the Jeffery company, but it is understood among Jeffery dealers that the quality of the parts of this car, many of which are imported, is such that the price as announced could not possibly be maintained with profit to the Jeffery company.

NEW YORK FIGHTING SEPARATORS

New York, Aug. 17—The dealers and garagemen of New York city, although they won out in the New York board of aldermen in having the gasoline

separator ordinance repealed, have yet to get the approval of Mayor John Purroy Mitchel; they are now waging the battle on this ground and appeared in strong array Friday noon, August 14, before the mayor. If he vetoes the repeal of the separator ordinance it will have to go back to the board of aldermen and it is known that strong influences have been brought to bear in opposition to the garagemen.

At last Friday's hearing the testimony introduced in the brief interval allotted to the garagemen was similar to that which had been gone over on numerous other prior occasions. The attitude of the fire department was characterized as oppressive and the insistence of the city upon the installation of an "inefficient, unnecessary and costly" device was condemned.

The installation of these devices has cost from \$200 to \$300 up to more than \$1,000 and the garagemen expressed surprise and characterized it as a last-minute move when Engineer Goodrich said such a device could and probably would be put in under city supervision for about \$100. "If this can be done," asked the garagemen, "why have we been paying such enormous prices for these devices in the past?"

The mayor closed the session abruptly, saying he would receive any further testimony in written form. His decision is expected within a few days, but no one in the motor industry can make an attempt to forecast it.

Manufacturers' Communications

NEWTONE DEFENDING ITS DEALERS

NEW YORK—Editor Motor Age—To correct an erroneous impression given by an article in your issue of August 6, where you referred to recent Lovell-McConnell litigation, with the implication that the Lovell-McConnell Mfg. Co. had succeeded in winning a preliminary skirmish by making the Automobile Supply Mfg. Co. a defendant, we would advise you that the facts in this matter are just the other way about.

On July 6, the Lovell-McConnell company filed a suit against Julius Bindrim, and by the next day the Automobile Supply Mfg. Co. had placed the subpoena in the hands of its own patent counsel who succeeded in obtaining a copy of the papers on July 9. The Automobile Supply Mfg. Co. at once sought to intervene and defend this suit against its dealer; but the Lovell-McConnell company refused to consent to the request, and the matter had to be argued in court where the Lovell-McConnell company's counsel again opposed it. Nevertheless, and in

spite of the Lovell-McConnell company's opposition, the Automobile Supply Mfg. Co. succeeded in obtaining from Judge Veeder an order permitting it to intervene and defend the suit.

The Hutchison patent in suit is for the "non-rigid elastic connection between driver (or cam) and the diaphragm." The Newtones and Newtone Superiors have a rigid non-elastic connection and of course are not infringements.—Automobile Supply Mfg. Co.

STATEMENT BY SPARKS

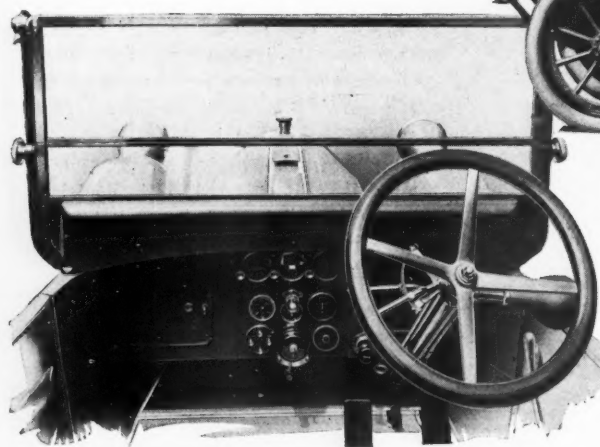
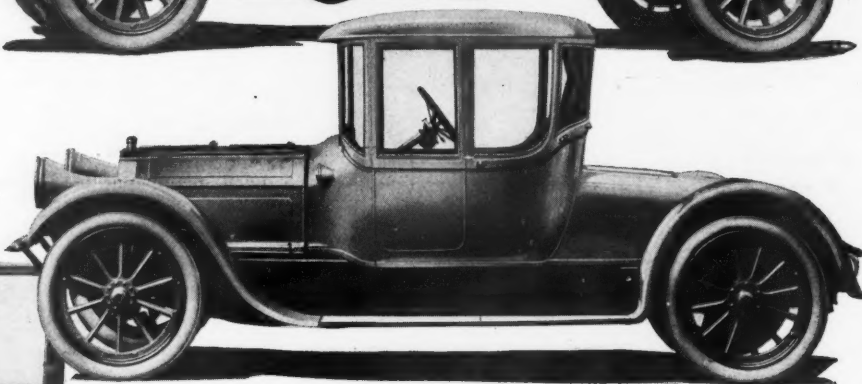
Editor Motor Age—New York—A case that has been pending in the patent office for some months—in which the Klaxon company has been trying to prove that it was the inventor of certain improvements in adjustability of motor-driven horns—has been decided against it. The patent was issued some time since to Mr. Sparks, and in passing on the matter the patent examiner stated that Klaxon representatives were unable to prove that Sparks was not the inventor. Sparks-Withington Co., William Sparks, general manager.

New Frame and Pressure Feed on 1915 Pierce-Arrows

Series Three Shows Refinements—Line Still Comprises Three Sixes

FEATURES OF THE 1915 PIERCE-ARROWS

Three sizes comprise the line
Central portion of frame
dropped
More accessible carbureter
Bodies are lower and clearance
unchanged
Control members simplified
Yale lock for switch bank
Engine primer simplified
Fifty-four body types offered
Fundamental chassis features
unaltered



Upper illustration is that of one of the 1915 Pierce-Arrow touring cars and that below is one of the coupes. At the left is shown the neat bank of dash equipment

ONE primary change has been made in the Pierce-Arrow series-three cars, as compared with the preceding model known as the series two. This has been a drop in the central portion of the frame. With this single change the entire appearance of the new line has been altered and in connection with its adoption one or two other minor changes have been necessitated. The principal alteration that has come up on account of the dropped frame has been the abandonment of the gravity gasoline feed and the substitution of a pressure feed system with the gasoline tank at the rear of the chassis. The introduction of the pressure feed has in turn caused a change which is the raising of the carbureter and hence an increase in its accessibility.

Prices are Unchanged

In keeping with its policy to build the highest grade car possible and to put the price accordingly, the Pierce-Arrow Motor Car Co. has found it essential to maintain the same price for the series three line as was charged for the series two with the exception of the large limousine

which now sells for \$7,000 instead of \$7,100.

On all three of the sixes which compose the Pierce line, it has been found possible on account of the increase in drop of the frame to lower the bodies and running boards without reducing the road clearance. There are also a number of other minor chassis changes which are designed to increase the convenience and comforts of the driver. The control members, including the accelerator, hand throttle and spark control, have been simplified; the electric starter is operated by a single push button on the dash in place of a pedal and in place of the plugs heretofore used, a Yale lock is provided for the bank of switches. The engine cannot be started if the bonnet is locked and the key removed from the ignition switch. The engine primer has been simplified and the housing of the universal between the clutch and the gearbox has now been extended to cover the entire mechanism.

It is in the body work that the Pierce company offers an exceptionally wide choice to the purchaser. There are fifty-

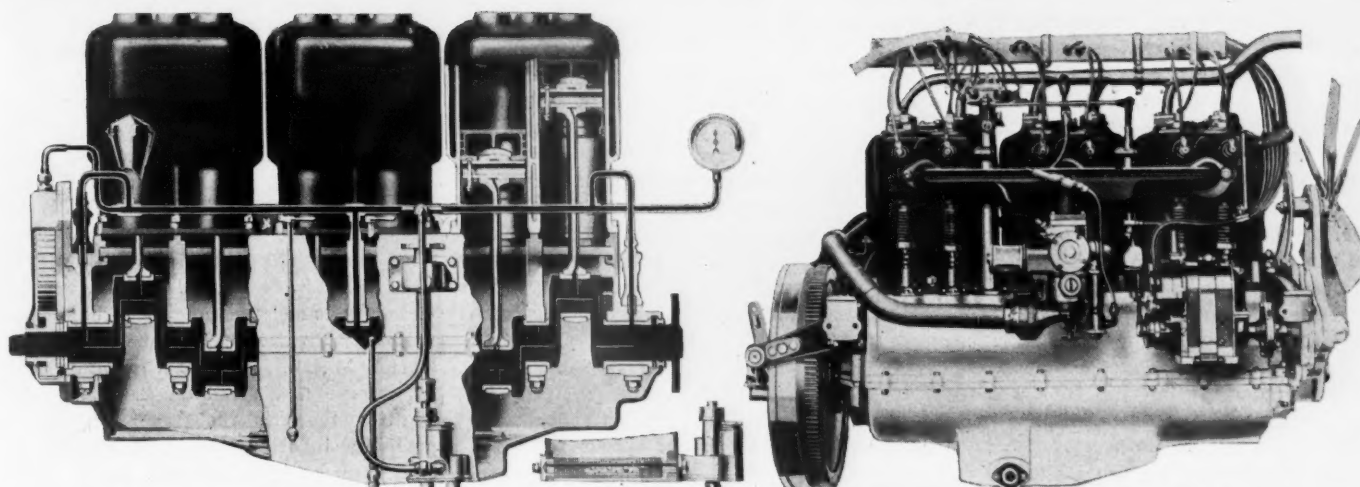
four body types and a practically unlimited number of color schemes to choose from. The Pierce company states that in offering such a wide range of choice it is excelling in variety even the foreign builder which sells its chassis separately. All of these bodies are entirely new in design. The standard brougham, landaulet, suburban and landau bodies have rounded corners, domed roof, and in general lines which have been kept simple but at the same time follow the streamline design of up-to-date practice. In addition to these standard types there are many modifications and combinations of different design. The brougham, landaulet and the suburban landau are arranged with unusually wide side windows, and are built with only flat roofs. All standard dome roofs designs have arch doors. All standard and optional flat roof designs are built without the arch doors.

Cars are Faster

signs and to the general improvement in

In addition to the different body disappearance by reason of the lower cars, many noticeable features stand out in the new models. In fact, the company states that these new models have more power, a better get-away, more speed, more comfort and more style than any previous models. The increase in power and pick-up is ascribed to the force-feed gasoline system and the style and appearance to the lowering of the bodies.

The fenders are of new and wider design and are calculated to give better protection against mud and water than for-



Two views of the motor used on the 1915 Pierce-Arrows, the illustration at the left showing the oiling system and that at the right the high position of the carburetor

merly. A Pierce top which has been named a Solitaire because it can be operated by one person is standard equipment on all the touring cars. The standard touring cars are fitted with individual front seats arranged with a space between to give easy passage from the front to the rear compartment. An undivided front seat will be provided if specified at no extra cost. All Pierce cars continue to be built with right drive and right control.

Tonneau Steps Illuminated

Two electric lights are provided in the backs of the touring car front seats to light the tonneau steps. The tail light and license illuminator are now combined in a unit and a rear bumper protects the gasoline tank against collision. The headlights are carried on the front fenders as in series two, but they have been moulded into the fenders with a more graceful curve and are now one of the most perceptible points of difference between the series two and series three models.

All three Pierce-Arrows are built along

are entirely similar and a description of the Pierce-Arrow product can be given as a unit.

Pierce-Arrow Motor Design

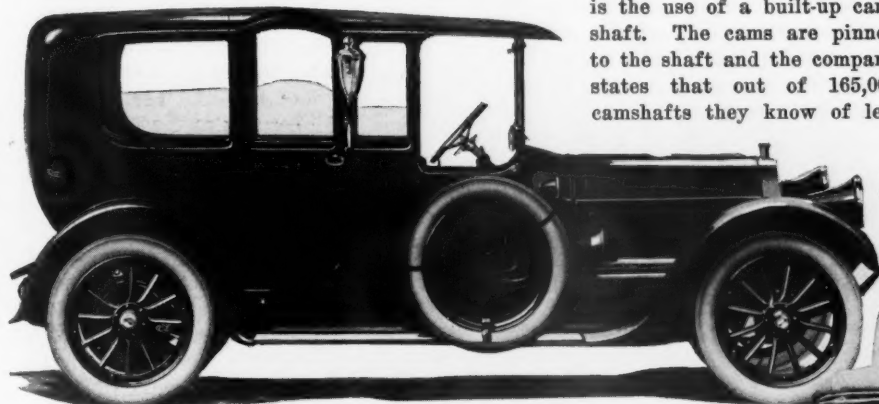
All three engines are six-cylinder types with the cylinders cast in pairs and have interchangeable inlet and exhaust valves located on opposite sides of the cylinders. The object in keeping the T-head design, according to the Pierce engineers, is to keep the valve area large and at the same time to maintain as short an overall length as possible. The crankshafts are provided with seven bearings and each bearing is lined with a white bearing metal that is imported from England. The bearing bushings are carried within a bronze shell and the white metal is cast directly into this shell.

The pistons have their wristpins at about the center and carry three rings above this point. At the bottom of this piston there is a wiper ring for distributing the oil. One point in Pierce-Arrow practice which is considerably different from that generally employed is the use of a built-up camshaft. The cams are pinned to the shaft and the company states that out of 165,000 camshafts they know of less

than ten cases in which the holding pins have sheared or become loose giving a percentage of failure of less than .005 per cent.

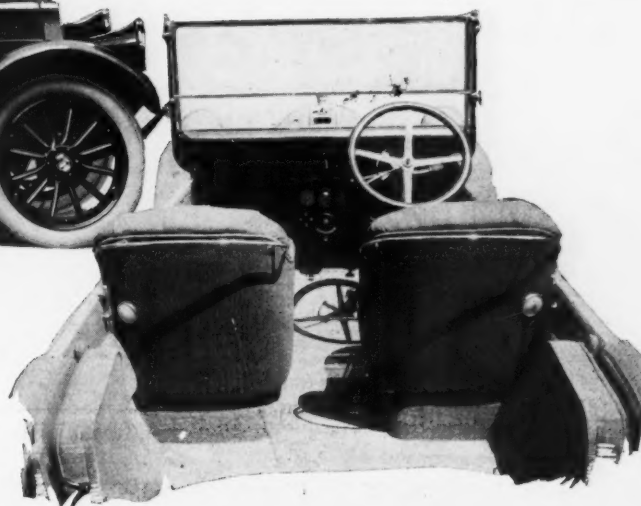
Pierce-Arrow motors are lubricated by force-feed. The oil is carried in a reservoir beneath the crankcase. A gear pump driven from the camshaft forces the oil through a long horizontal tube from which it is distributed to the two end and central main bearings and to the timing gear case. From the bearings to which the oil is pumped it passes by means of the hollow crankshaft to the other main bearings and to the big end bearings of the connecting-rods. At each of these points there is a hollow core through which the oil is forced to the bearing surfaces. The connecting-rods carry leads up which the oil passes to the wristpin bearings and through the hollow wristpins to the walls of the cylinders. On the end of the horizontal main oil lead, there is a pressure gauge which registers the pressure under which the oil is being fed. This system is designed to be positive and to vary uniformly with the speed of the motor. While there is no splashing of the oil all the interior parts of the motor are reached by the spray thrown off by the rods.

The electrical equipment includes a



similar lines. The 66-horsepower is known as the 66 A-3; the 48 as the 48 B-3 and the 38 as the 38 C-3. The power plants of all these chassis are of course different in size, the largest being 5 by 7 inches; the 48, 4.5 by 5.5, and the 38, 4 by 5.5 inches. With the exception of the differences in size, lines of design of these three models

The upper illustration is a Pierce-Arrow limousine job and that at the right a view of the touring car showing the passageway between the front seats



starting and lighting system and two independent ignition systems. Starting and lighting are taken care of by a Westinghouse two-unit outfit which operates at 6 volts. All the wiring throughout the car is done by the single-wire system, the return conductors being carried in copper tubes attached to the frame. The ground connections are soldered to the copper tubes and in connection with the chassis frame form the feed conductors of the circuits. An over-running clutch breaks the connection between the cranking motor and the engine when the crankshaft is driven under the impulses of the engine. A feature which is of importance in the installation of the starting system is the incasing of all electrical units such as the gears, shifting rods, starting switch, etc. The main source of ignition current is provided by a Bosch magneto, while for the secondary ignition system the storage battery is used as a source of current supply through separate induction coils and commutators.

Changes in Carburetor System

The gasoline system has been entirely reverted. The carburetor is the same in all essential details but the jet sizes, for instance, had to be changed in shifting from the gravity to the pressure feed. Owing to the higher position of the carburetor there is no possible danger of recondensation of the fuel in the upper part of the manifold and the result has been a car with a much better pick-up than the previous car. The Pierce gasoline tank will now be found on the rear of the car and the objection to this position, namely, its liability to damage, has been answered by the application of the rear bumper.

Power is transmitted from the motor to the running gear through a cone clutch. Pierce clutch design is distinctive in that it is kept constantly

lubricated by means of an oil ring so designed that a small quantity of neat's foot oil is held constantly in contact with the leather. In order to gain additional smoothness, flat springs are placed beneath the leather surface of the clutch.

Four speeds are provided in the gearbox. This gearset is a selective sliding design held in an aluminum alloy case. This case is divided into two separate sections to permit of ease in assembly and to cut repair costs down to the limit. The gears are carried upon cylindrical six-spline shafts and the material of which they are made is chrome-nickel steel. An interlocking device is fitted which renders it impossible to change speeds while the clutch is engaged. The same interlock prevents two gears from being meshed at the same time. An air pump for inflating tires is connected through a clutch to the gearbox countershaft.

The drive shaft is provided with a universal at both ends and also a sliding joint at the rear to compensate for the vertical free motions. There is a torque rod also for taking the drive and this is fitted with a spring, cushioned and swiveled front support and a pivoted rear connection to take all the torsional strains. The rear end of the drive shaft is hollow and splined, the splines sliding in corresponding flutes in the rear universal, thus providing the compensation for the rising and falling of the chassis due to the action of the rear springs. Lubrication of the sliding joint is provided by means of a charge of grease which is contained in the hollow end of the driveshaft. The bevel pinion shaft housing is entirely separate from the main axle house, but it is bolted securely to the latter.

The rear axle is of a semi-floating design. The axle housing incasing the drive shafts of nickel steel, are brazed and riveted into the pressed steel housings inclosing bevel gear and differential assembly.

The front axle has a drop which commences directly at the steering knuckle and sweeps into the center of the axle in a gradual curve. The steering torque rod is at the level of the lower part of the axle and the steering gear itself is a multiple screw and nut type of semi-irreversible design.

Full equipment is found on the Pierce-Arrow cars and this year is more luxurious than ever before. Wire wheels may

be secured at an extra cost but the standard cars are fitted with wood wheels having Johnson patent demountable rims. The extra tires and rims are carried on the running board and this year the Silverton cord tires will be found as standard equipment. In addition to the actual constructional features of the car all models will be regularly equipped with hand inspection lamps and a full instrument board which includes clock, speedometer, oil and gasoline pressure gauges, voltmeter, ignition and light switches and starter button. Magnetic gasoline tank gauges are now fitted on the tanks. In addition there is the power driven air pump for inflating tires, a bulb and electric horn collision bumper, trunk rack, shock absorbers, a supply of oils and grease, extra valve and spring, storm curtains, mud aprons, ventilators, tonneau lamp and in inclosed cars there is an adjustable foot-rest, Waltham clock, umbrella holders and every equipment that makes for luxury known to the modern enclosed car. Prices are as follows:

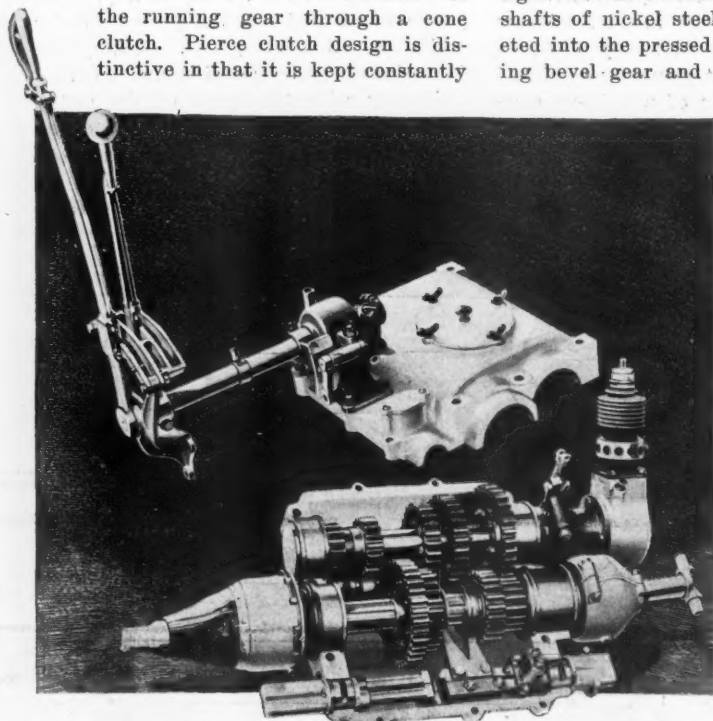
	38-C 3	48-D 3	66-A 3
Seven-passenger	\$4,300	\$5,000	\$6,000
Five-passenger	4,300	4,900	5,900
Roadster	4,300	4,900	5,900
Limousine	5,200	6,000	7,000
Vestibule brougham....	5,350	6,200	7,200

AFFECTED BY U. S. L. RECEIVERSHIP

Buffalo, N. Y., Aug. 19—Claiming that the recent appointment of receivers for the United States Light and Heating Co. crippled the business of his concern, Elias L. Toy of Philadelphia, Pa., last Thursday afternoon filed action here in United States District Court against the Buffalo Rubber Mfg. Co., asking that a receiver be appointed for that company. Judge Hazel immediately granted the request and John A. Lynch of Buffalo was appointed receiver, bond being placed at \$2,500. Saturday an answer by the directors of the Buffalo Rubber Co. was filed in the federal court admitting the allegations charged against it by Elias Toy. It replied that the company is insolvent and it approved of the receivership.

The petitioner, president of the rubber company who filed the affidavit accompanying the petition at the request of the board of directors, states that when the United States Light and Heating Co. of Niagara Falls, N. Y., which had been the chief customer of the Buffalo concern recently went into hands of receivers for the purpose of conserving the assets of that company, the Buffalo Rubber Mfg. Co. was unable to continue the manufacture of rubber because the receivers for the heating company canceled a large quantity of orders from the rubber company. The complainant claims that the rubber company will be unable to manufacture and market its goods until the heating company again begins operations as usual.

The assets of the company, Mr. Toy states, are greatly in excess of the liabilities and with proper care can be conserved and the business placed on a firm basis.



SHOWING BOTH HALVES OF PIERCE-ARROW GEARSET HOUSING AND THE POWER AIR PUMP

Woods Mobilette Has Under-Overslung Frame for 1915

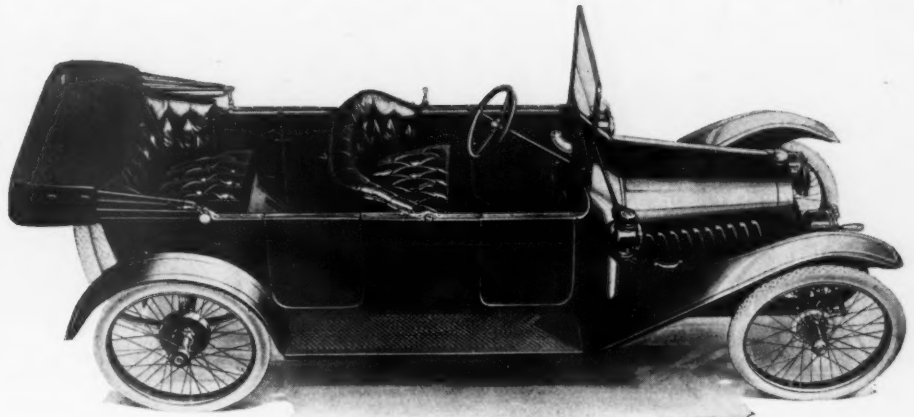
Underslung Rear Springs—Streamline Body—Cowl Tank

AN entirely new car has been announced by the International Cycle-car and Accessories Company, Chicago, as their product for 1915, this car to be known as the Woods Mobilette, model 3. It is featured with a four-cylinder water-cooled motor, body with tandem seating for two persons, 36 inch tread and selective gearset and its price has been set at \$380. The general outside appearance of the new Woods has so been changed as to make it entirely different from the previous car marketed. It resembles many of the small cars now offered having long running boards, tapering hood, cowl fuel tank, streamline body and as an added feature under-overslung pressed steel frame.

Four-Cylinder Water-Cooled Motor

The motor has a bore and stroke of $2\frac{1}{2}$ by $3\frac{1}{2}$ inches and is of L-head construction with the valve mechanism inclosed. The cylinder and upper half of type crankcase are cast as a unit and the cylinder head is bolted to the top of the casting. The left side of the engine is clean except for the water inlet pipe. On the right side is the magneto, carbureter and oil pump. Cooling is by thermo-syphon system. The engine is suspended by three points from a pressed-steel frame which is of the under-over type. In this the front portion is suspended under the axle and the rear portion over the axle.

From the motor the power is taken by a leather-faced cone clutch with spring inserts and thence by shaft to a two-speed selective gearset incorporated with the rear axle. This is of the floating type. The rear springs are elliptic and under-slung while the front are semi-elliptic and hung above the axle. Propulsion is through the springs and torsion tube which surrounds the propeller shaft.



BODY VIEW OF THE NEW WOODS MOBILETTE, A TWO-PASSENGER TANDEM-SEATING CAR WHICH SELLS FOR \$380

FEATURES OF THE 1915 WOODS MOBILETTE

Four-cylinder $2\frac{1}{2}$ by $3\frac{1}{2}$ inch motor
Drive by cone clutch and two-speed gearset
Underslung rear springs
Tread 36 inches, wheelbase 102 inches
Cowl gasoline tank

Wire wheels of 28 by $2\frac{3}{4}$ inches are regular equipment. The body is of sheet metal and accommodates two persons sitting tandem. The car's wheelbase is 102 inches and the tread 36 inches. Equipment at \$380 includes two side oil lamps, taillight and set of tools and added equipment including top and windshiled is \$15 extra. The body is interchangeable with a commercial body.

WESTCOTT CHANGES

The Westcott Motor Car Co., Richmond, Ind., make announcement of several

changes in the management which took place on the first of August. H. L. Ashley, who has served as general manager for several years, has been compelled by ill health to give up his active connection with the company. He is succeeded as general manager by H. G. Root of Springfield, Ohio. G. F. McCurdy, who has held the position of sales manager, is advanced to the position of assistant general manager. H. P. Mammen, formerly district sales manager for the Cole Motor Car Co. in the central states, becomes sales manager of the Westcott company.

Simultaneously comes the announcement of a new series of 1915 models of the Westcott car, to be known as series B and to sell at the new price of \$1,150. The car is equipped with the Northway motor, the Atwater Kent ignition system, and the Jones electric lighter and starter.

COAST DEALERS ORGANIZE

San Francisco, Cal., Aug. 10—After hearing R. H. Daniels, head of the service bureau of the Goodyear Tire and Rubber Co., Akron, Ohio, in a talk on upholding the prices on tires and other rubber goods or accessories made by the tire concerns and directly interesting the motor car supply and accessories dealers, about 120 of the latter who attended the meeting which was in the shape of a dinner held in one of the big hotels, decided unanimously to form the Motor Car and Accessories Trade Association, the officers of which will be elected within a short time.

Dealers in Stockton, Oakland and other cities in this territory already have started organizations for the same purpose and District Attorney H. L. Hynes, Alameda county, was quoted as holding that such organizations do not violate the Cartwright anti-trust law. He was reported to have given his opinion that such trade organizations do not conflict with the federal law.



COMMERCIAL BODY MOUNTED UPON THE WOODS MOBILETTE CHASSIS. THIS BODY IS INTERCHANGEABLE WITH THE PASSENGER BODY

McFarlan a Lighter Car with a 4-Inch Longer Wheelbase

Cone Instead of Disk Clutch—Two Six Chassis Offered

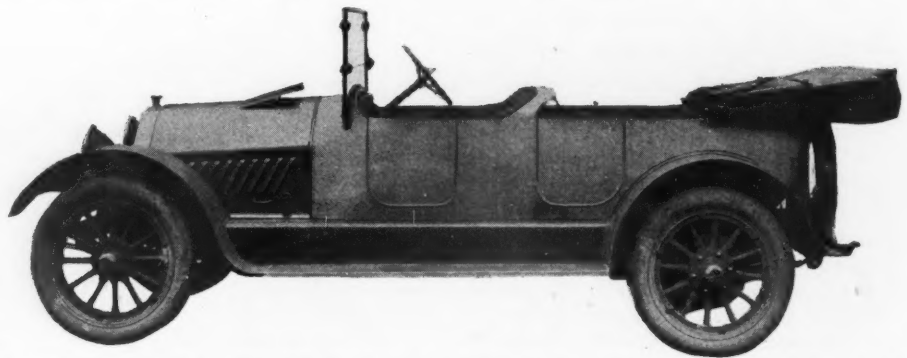
INCREASE of 4 inches in the wheelbase, notwithstanding a 300-pound weight reduction, option of electric cranking in place of its pneumatic system and an entirely new body design are the features of the new McFarlan six for 1915. Other changes of importance include the use of a cone instead of a disk clutch, Westinghouse ignition, adoption of the Stewart vacuum fuel feed and the placing of the gearshift lever between the front seats.

In its new form, the line includes two models, both sixes and both alike in every respect except that one has a 4-inch bore and the other a bore $\frac{1}{2}$ -inch greater. The motor is a T-head block casting 4 or $4\frac{1}{2}$ by 6 inches with a cone clutch in the fly-wheel. The gearset is located at the floating rear axle, the wheelbase is 132 inches and tires are 36 by $4\frac{1}{2}$. Prices remain at \$2,590 for open models with the 4-inch motor and \$2,900 for the same bodies with the $4\frac{1}{2}$ -inch motor.

In the essential parts, motor, rear system, and so forth, the new McFarlan six is very little different from the car of a year ago and 2 years ago. Indeed the new car still is known as the Series T, which designation has applied to the McFarlan flag bearer since 1912. Outwardly the car is very different, but the changes are those of fashion rather than of basic design.

The wheelbase is longer than it has been heretofore, but still it is short enough so the car is thoroughly practical. The McFarlan never has been a car of very long wheelbase, but a longer one was necessary for the present season, if the demand for a lower car was to be met.

While the McFarlan is 300 pounds lighter this season than it ever has been before, very little of the weight has been taken out of the chassis. The improved body construction throws part of the strain that the body is called upon to withstand, upon the metal parts, which allows the framework of the body to be made nearly two-thirds lighter than be-



THE 1915 MCFARLAN SIX TOURING CAR WHICH IS EQUIPPED WITH EITHER A 4 BY 6 OR $4\frac{1}{2}$ BY 6-INCH MOTOR

FEATURES OF MCFARLAN SIX

Wheelbase 4 inches longer, now 132 inches
 300 pounds weight reduction
 Vacuum gasoline feed
 New tire carrier
 New arrangement of gear and brake levers
 Westinghouse electric or McFarlan pneumatic starter optional
 Westinghouse ignition
 New body lines
 New cone clutch
 Wiring in conduits
 Price with 4x6 motor, \$2,590
 Price with $4\frac{1}{2}$ x6 motor, \$2,900

fore, and the saving in weight is considerable.

The new clutch is somewhat lighter than the old assembly, the new middle cross member assembly is lighter, and the top half of the rear springs are not so long as formerly, all of which save a little weight without weakening the car, but the principal saving is in the body.

Spare tires are carried on the rear of the car as heretofore, but the old method of fastening them, where four straps must

be manipulated, has been done away with. The new carrier has a heavy strap that holds the tires and only one buckle must be manipulated to either fasten or loosen them.

What is regarded by McFarlan engineers as a nearly ideal arrangement of the gear and brake levers is shown in the view of the front compartment of the car. The gear lever is alone between the front seats, and the tip of the lever comes only flush with the tops of the seats. Previous attempts to place this lever here have not been successful because either the brake lever was placed here too, which cut down the room for the gear lever, or the range of action required for the gear lever was so large that there was not room for it between the seats.

In the McFarlan the new arrangement separates the brake and gear levers, and the amount of room required for the gear lever action is very small; so the lever works very nicely between the seats. The brake lever is set well out in front, partially to get it out of the way, but principally to get it in an easy position for the driver. Between the levers, the passageway from one front seat to the other is clear.

There are some chassis features that are quite different from those of previous years. The most notable of these is the Westinghouse system of starting, lighting and ignition, which has been added for the current season. The starting system is optional, but the Westinghouse lighting and ignition system is used on all models. The McFarlan pneumatic starter which has been featured for some years past will be equipped if the purchaser desires.

On the intake side of the motor is the generating unit, and on the exhaust side is the starting motor. It will be noted that both units are in very accessible positions. The generating unit carries the distributor for the ignition system, the current for which is drawn from the storage battery. The generating unit of



REAR COMPARTMENT OF THE 1915 MCFARLAN TOURING CAR SHOWING THE EXTRA SEAT FOLDED INTO THE BACK OF THE FRONT SEAT



VIEW OF THE
1915 MCFARLAN
SHOWING THE
NEW POSITION OF
THE CONTROL
LEVERS AND THE
SIMPLE COWL

this system is so designed that the current output increases when the drag on the battery increases, which feature makes it effective in keeping up the battery. The starting motor is designed to give high speed with a low current consumption. The whole system is built with the idea of protecting the storage battery as much as possible.

All wiring is in flexible conduits. There is not an exposed wire on the car. Conduits are oilproof and dustproof, and there is very little likelihood of the wires deteriorating during the life of the car and causing trouble. A one-wire system with ground return is used throughout the lighting and starting systems.

Another rather radical departure for the McFarlan is the addition of the Stewart vacuum system of gasoline feed, the use of which eliminates a little gasoline pressure pump on the motor, an air line to the gasoline tank, a pressure gauge and a hand pump. With this system the gasoline is sucked up to an auxiliary tank on the dash by the suction of the pistons, and is then fed to the carburetor by gravity.

Disk clutches have been the rule on McFarlan cars for so long that a change to a cone clutch is notable. The change was made with three things in view: lessening the weight, simplifying the chassis, and providing more holding surface in the clutch.

It is a leather-faced cone 16 inches in diameter and with a 4-inch face. Under the leather are twelve flat springs that are adjustable so engagement of the clutch can be made very easy or rather fierce. The assembly is very light, and consequently its turning momentum is not great, and stopping the clutch when it is put out is very easy. This makes gear shifting easier than ever.

Outwardly, the new car is very different from previous models. Naturally, lengthening the wheelbase gives it a longer appearance, and this also allows the builders to set the body considerably lower than it has been heretofore. The new lines are quite distinct. The upholstery does not project above the body

lines at any point, and the top line of the side of the body is continued clear around without a break. The little cowl over the back of the front seat is an unique little idea that will find favor. It not only adds to the beauty of the car, but serves a practical purpose in furnishing a place to put a small box for gloves, veils and the thousand and one small things that usually are placed around on the floor of the tonneau. The extra seats fold down under this box and the whole effect of the back of the front seat from the inside of the car is smooth. No part of the seat projects into the rear doorway.

Tonneaus on the six and seven-passenger models are 62 inches long over all, the cushion being 22 inches wide, and the length from the front of the rear seat to the back of the front seat being 40 inches.

Two motors are fitted in the same chassis, a practice which was started last season and met with quite a success. The chassis model containing the 4 by 6 motor is known as Series T, and the chassis containing the 4½ by 6 motor is known as the Series X. The same line of bodies is fitted to both chassis. The line includes a two-passenger touring roadster; four, five, six, and seven-passenger touring models, a four-passenger coupe, and a seven-passenger foredoor limousine.

LABOR REPORT FROM DETROIT

Detroit, Mich., Aug 17—According to the annual report of the department of labor of the state of Michigan, the labor inspectors inspected 11,823 manufacturing concerns, stores, shops and other places of business, which employed a total of 407,552 wage-earners, in 1913.

From the statistics contained in the report it was determined that 582 establishments were in one way or the other directly connected with the motor industry and that they employed 90,673 employees or 22.2 per cent of the total recorded.

In this total 37,662 were employed by Detroit motor car manufacturers, while, including the other industries and trades, the total number of wage-earners in the motor car business in Detroit was 71,104

or 78.4 per cent from among the total of 90,673.

The concern which had the largest number of employees at the time of inspection in the whole state was the Ford Motor Co., which is credited with a total of 14,100. The Studebaker Corp. followed with 6,970 employees, then came the Buick Motor Co., Flint, with 4,700, followed, closely, by the Packard Motor Car Co., 4,524. Among the parts and accessories manufacturers the United States tire plant—the old Morgan & Wright—was first with 3,095 to its credit. Dodge Bros. follow with 2,574, then came the Timken-Detroit Axle Co., 1,582; the Fisher Body Co., 1,529; the Weston-Mott Co., Flint, 1,180; the C. R. Wilson Body Co., 1,145.

From among the 407,552 employees, 302,802 were men, 49,604 were women, 2,026 were boys between 14 and 15 years old, and 1,285 were girls of the same age. The average daily wages of all the employees were \$2.41 or 10 cents more than the average in 1912 and 10 cents more than in 1911. The average wages of the factory men were \$2.47 daily, those of the women \$1.33, those of the boys \$1.08, those of the girls \$0.91, those of the factory superintendents \$5.32 and those of the foremen \$3.77.

The number of motor car plants in the state recorded was forty-two or twenty-four fewer than in 1912 and sixteen fewer than in 1911. The factories in Detroit numbered twenty-seven or 7 fewer than in 1912 and three fewer than in 1911. Many of those factories had been absorbed by others, while some had failed or given up the manufacturing of motor cars.

INSURANCE MEN LEARN CAUTION

Milwaukee, Wis., Aug. 17—That insurance companies are making a close investigation of every motor car risk on fire, theft and liability policies, to determine the character and habits of the insured has been discovered in Milwaukee through the excitement incident to the cancellation of many policy contracts during the last two weeks.

Insurance agents are reticent concerning the matter, as many of them are required to act as special investigators and make reports, which later are verified by special agents of the companies so that no unscrupulous agent will pass undesirable risks. In past years it has been the custom to accept as many risks as could be procured, but severe losses due to incendiarism and carelessness have awakened the insurance companies to the seriousness of the situation and no policy is now kept in force unless the habits and general character of the policyholder meets with the requirements of the company.

It is said there are many cars in Milwaukee that are not covered by fire, theft or liability policies because past experience has shown the owners to be undesirable or "risky" risks.

Lyons-Knight Retains Worm Drive Rear Axle for 1915

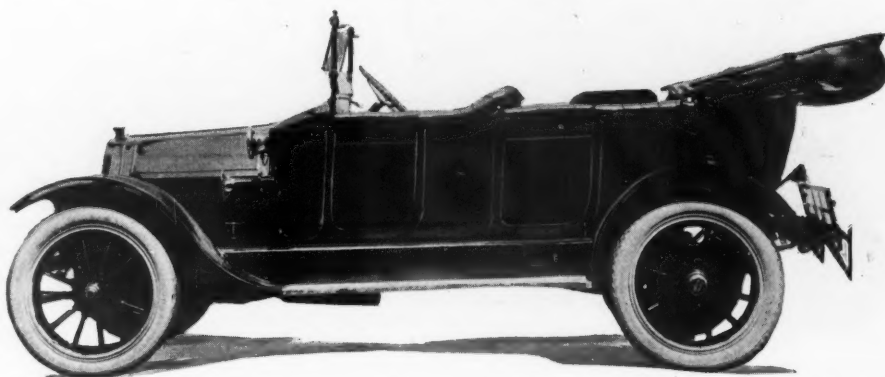
Four Improved Bodies On Single Unchanged Chassis

MANY body refinements without changes in essential features mechanically, mark the Model K Lyons-Knight which is continued for the 1915 season. The Lyons-Atlas Co., Indianapolis, Ind., offers four bodies on a single chassis, the prices remaining the same as 1914. The seven-passenger touring car sells for \$2,980, the five-passenger for \$2,900, a five-passenger sedan at \$3,900, and a seven-passenger limousine at \$4,300. In addition, two-passenger roadsters are built on special orders.

Chassis Features

All these bodies are mounted on the characteristic Lyons-Knight chassis, which is featured by its sleeve-valve engine and worm drive. The chassis has a wheel-base of 130 inches with 37 by 5 tires, non-skid in the rear. The chief changes in the new cars are the better lines on the bodies, the five and seven-passenger bodies being of a modified streamline type with the upholstery carried along the tops of the doors, giving a straight-line effect from front to rear. The sides are unusually high and both front and rear seats are rather wider than usual, the latter being 52 inches.

All instruments such as speedometer, clock, gasoline gauge, oil pressure gauge, ignition and lighting switch and so on now are mounted flush with the instrument board. A convenient feature of the lighting control is a switch which may be locked in any combination of lights. Equipment is somewhat more complete than formerly and consists of a Golde one-man top, and option of Jiffy or Collins curtains, Warner speedometer, a combination double tire holder and trunk



ONE OF THE LYONS-KNIGHT TOURING CARS, THE BODY LINES OF WHICH HAVE BEEN IMPROVED, GIVING THE CAR A BETTER STREAMLINE EFFECT

FEATURES OF THE 1915 LYONS-KNIGHT

Single chassis and four body styles

Prices remain unchanged

Body lines improved

Lighting switch may be locked in any position

Four-cylinder Knight engine, 4½ by 5½ inches

Worm drive retained

Rear axle gearset still featured North East single unit cranking and lighting

rack, two extra demountable rims, and Manzel power tire pump.

Mechanically, there is no change in the car. The Knight engine which is manufactured by the Lyons-Atlas company is a four-cylinder, 4½ by 5½, and although the S. A. E. rating is but 33.4, factory test has shown that it develops 52 horsepower at 1,200 r. p. m., and a maximum of 76 at 2,000. The cylinders are cast in pairs and the crankcase, chain case and cylinder head covers are cast of aluminum. The feature of covering the cylinder head to keep out dirt and moisture and to protect the spark plugs is exclusive with the Lyons-Knight engine. Hard-rubber buttons are mounted on the covers by which the spark plugs can be short-circuited and tested without removing the covers. Crank and eccentric shafts are carried on five bearings and fitted with adjustable bronze bushings,

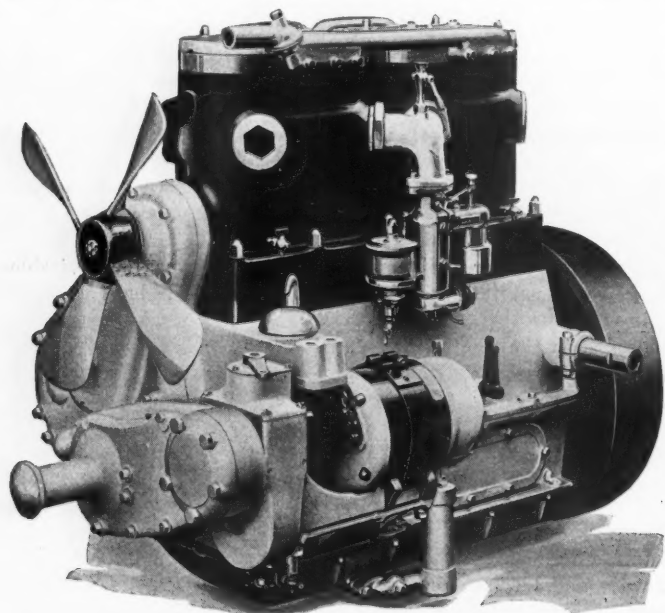
babbitt lined. These two shafts, as well as the connecting rods, are heat-treated chrome-nickel steel. The eccentric shaft together with magneto pump, starter and fan are driven by silent chain in order to do away with possibility of noise from the timing drive, a feature most necessary with the sleeve-valve type of engine on account of the quietness of the valve operation.

Every Part Directly Oiled

Lubrication is by force feed to all bearings, pistons and sleeves. An oil reservoir is located in a sub-base of the crankcase, having an intermediate air space to prevent overheating of the oil. A plunger pump operated by one of the sleeve eccentric rods takes the oil from the reservoir and forces it under pressure to the crankshaft and eccentric shaft bearings, the eccentric rod bearing and thence through holes drilled through the center of the crankshaft to the connecting rod. The latter are hollow and the oil is forced through their interior to the upper bearing. The piston pins likewise are hollow, and the oil flows to these to the outside of the piston, thence through holes in the sleeves to the cylinder wall, so that all friction surfaces are lubricated by a positive flow. An adjustable oil pressure regulator is connected with the throttle lever so that the pressure of the oil is in proportion to the engine speed.

Ignition is furnished by a Simms dual, high-tension magneto of the waterproof type. Cooling is by a centrifugal pump, honeycomb radiator and a four-blade cast aluminum fan, which is operated by a silent type of chain. Following the European custom, the fuel tank is mounted in the dash cowl, giving a gravity feed to the specially designed Stromberg carbureter.

Cranking and lighting is provided by a single-unit North East system which is connected directly to the front end of the crankshaft to a silent chain. A simple foot button connects the starter, and when released converts the motor into



CARBURETER SIDE OF THE LYONS-KNIGHT ENGINE SHOWING THE CRANKING AND LIGHTING UNIT



SEVEN PASSENGER LYONS-KNIGHT LIMOUSINE WHICH SELLS FOR \$4,300

a generator for charging the storage battery, the latter furnishing current for the starter, the lighting equipment, and the electric horn.

From the motor, power is transmitted through a three-plate dry-disk clutch, three-speed selective gearset, worm final reduction, and floating axle. The clutch is inclosed in the flywheel, the single central floating member engaging by being gradually compressed between the two outside plates through the action of three powerful toggle joints. A special bronze casting is used for housing the gearset, differential and worm gear, which are in unit, and to which is attached the seamless steel tubing on which the wheels are mounted. Differential case and wheels are fitted with Timken bearings. The three-inch torsion tube incloses the drive shaft and terminates in a large, hollow, bronze, ball and socket joint at the forward end and is attached to the heavy center cross-member of the frame.

One of the main features of the Lyons-Knight design is the worm drive. This is of the underslung type and runs in oil. In spite of the fact that the worm is underneath, it has a clearance of 10 inches above the road.

Suspension is by three-quarter elliptic springs at the rear, 54 by 2½ inches in size, and one-half elliptic springs in the front, 38 by 2½ inches. All ends being provided with bronze additions to give easy replacement in case of wear. The front springs are very quiet, being arranged in this way so that they hold the front axle parallel with the rear axle, and prevent wobbling of the front wheels on rough roads. All models are equipped regularly with wood wheels which carry demountable rims, accommodating either straight-side or clincher tires. Expanding and contracting brakes act on 16 by 2½ drums.

AFTER CARELESS MOTORISTS

Indianapolis, Ind., Aug. 17—The Hoosier Motor Club has issued the following public appeal which is self-explanatory:

"The Hoosier Motor Club always has stood for laws safeguarding the public, as well as the owners of motor cars. This has been shown by its advocacy of the strict enforcement of existing laws and ordinances.

"There has been of late an increase in the number of deaths from motor car accidents due to careless driving and utter disregard for the existing laws and the rights of all the people. Therefore, this club feels that it can in no way better serve the public, as well as the careful drivers of motor cars, than by leading a movement to raise a fund with which to secure the services of a special prosecutor to aid in the prosecution of those guilty of criminal carelessness and wanton disregard of the motor laws.

"It would seem, judging by the growing number of accidents, that nothing short of the extreme penalty of the law will serve to stop the reckless endangering of the lives of innocent.

"To this end the Hoosier Motor Club has decided to receive subscriptions for a special prosecutor's fund and we ask all those interested in the cause to confer with our secretary and to send subscriptions to the secretary. The subscriptions will be announced from time to time.

"Our pride in Indianapolis impels this club to see if some means cannot be provided whereby the wilful violators of the motor speed laws may be punished as they justly deserve."

NEW YORK TO BOOST GARAGE RATES

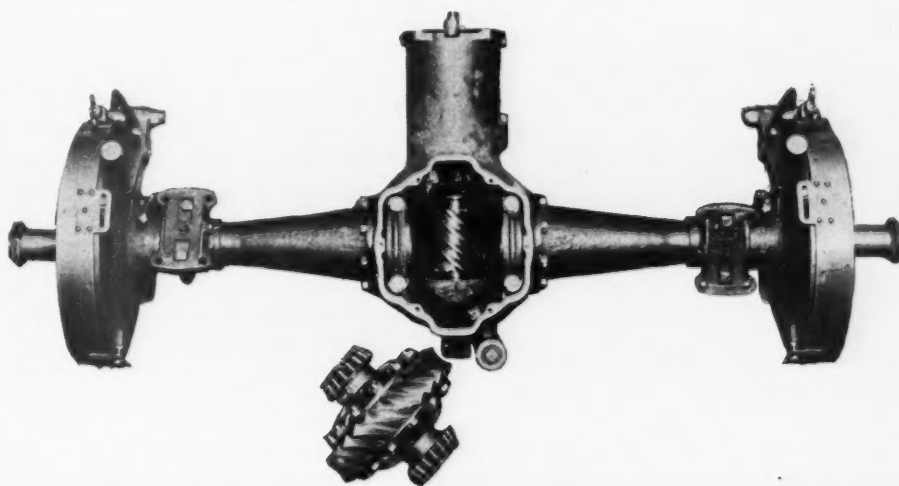
New York, Aug. 17—If the work of the storage committee which has been working among the garages on New York's west side is successful prices of storage in that section of the city will be generally advanced September 1; also, gasoline will be lowered to a point where the price gives the garage a 5-cent profit.

The committee is made up of west side members of the New York Garage Association, and it has been the hope of the whole organization that some time storage throughout the city might be placed on a paying basis and the profits on gasoline made normal. Up to the present there has been little if any profit in storage, the profit of the business being derived from gasoline sold at an abnormal profit.

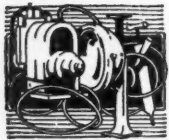
Many independent gasoline stations have recently sprung up in and about the city, selling at a small margin, and this has cut into the garage gasoline trade; garages which insist that patrons buy gasoline in the garage have met opposition. All recognize the advisability of putting storage on a paying basis and making the retail price of gasoline follow the wholesale figure. The agitation is not new but has not been successful up to now.

The Royal Garage has informed its patrons that its rates will be adjusted September 1. The proprietor states that he will make this move regardless of whether the others raise or not. August 1 he dropped gasoline from 25 to 20 cents and under the new storage rates will drop it to 18, allowing a 5-cent profit.

The proposed rates are in grades A and B, depending somewhat on the locality and more on the style of building, whether old or modern. Grade A rates would be \$40 for open cars and \$45 for inclosed cars; grade B rates would be \$5 lower, \$35 and \$40.



REAR AXLE UNIT OF THE LYONS-KNIGHT SHOWING THE WORM DRIVE ASSEMBLY AND CASE FOR THE GEARSET



The Accessory Corner



AMONG the jack-making specialists is the National-Standard Co., Niles, Mich., which is marketing the Standard line of jacks of all types. They are made for several lifting capacities and purposes, and lift either by ratchet mechanism or by screw arrangement. The latest type to be placed on the market by the Niles concern is the Standard tire saver and garage jack, which is made primarily for quick action, and is preferably used in sets of four so that the car may be completely lifted from the floor at its four corners, thus prolonging the life of the tires when the car is to stand for any length of time. The new tire-saving jack is illustrated at the extreme right in Fig. 1.

The new National jack is made of malleable castings and the foot of the frame is of generous proportions to give needed support against tipping over. The lifting bar is inclosed and cannot fall apart when moved. Another point is that the teeth are placed close together, permitting of a wide range of action. The top of the lifting bar is swiveled, allowing for its being turned to any desired position. The jack may be readily adjusted to fit any size wheel from 30 to 42 inches in diameter. The price for a set of four is \$5.50. The other jacks of Standard make range in lifting capacity from 1,500 to 2,000 pounds. One very good model is the No. 1, which is a 1-ton jack of the enclosed ratchet type and which has a height with bar down of 11½ inches. With the lifting bar raised, this dimension is 18 inches. It weighs 9½ pounds and lists at \$4. This is suitable for the heaviest cars. The Baby Standard at \$3 lifts 1,500 pounds, weighs 6½ pounds, and has a height with the bar down of 10½ inches.

For use with Fords or other light cars, a screw-type jack selling at \$1 has been brought out. It weighs 4 pounds and has a 6-inch lift. The National company also makes a metal handle for jacks where it is necessary to lift large, heavy cars. These serve a double purpose, as they have a tire removing tool on one end as shown in Fig. 1. The length of these handles is regularly 15 inches, but for use with cars having a considerable overhang at the rear axle, they may be had 18 inches in length.

Elliott Painting System

Frank H. Elliott, Wichita Falls, Texas, has just perfected a system of painting which results in a job which will withstand extreme heat, cold, acidified water and will not chip or crack even if the material upon which the paint is spread is bent. The system consists of primers,

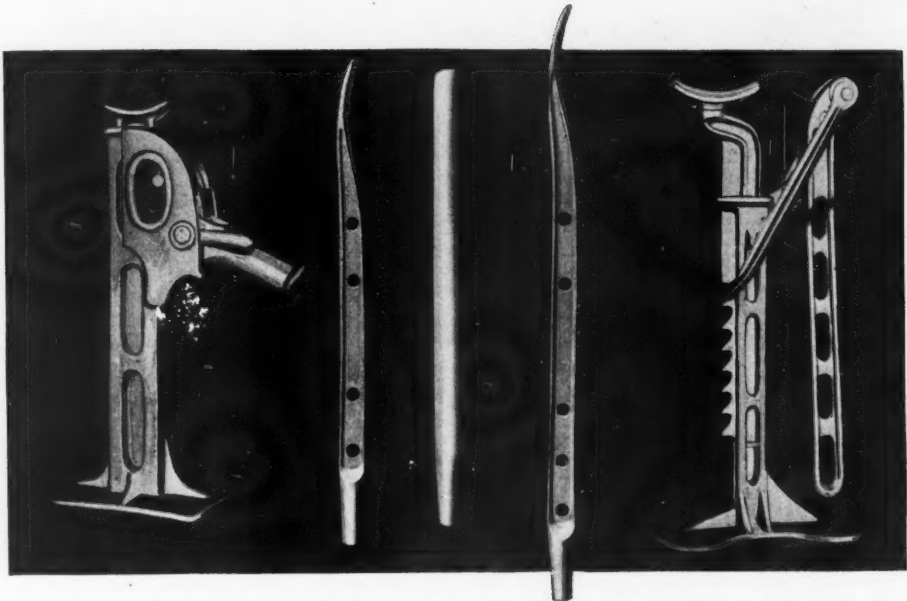


Fig. 1—Two new types of Standard motor car jacks and the handles which serve also as tire tools

fillers, etc., and the various coatings, which can be applied to either wood or metal. The coatings are claimed to cling to one another and hence damage

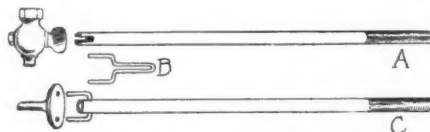


Fig. 2—Ford combination tool, showing at A its use as a pet-cock wrench and at C as a valve grinder using attachment B

due to bending or heat or cold is eliminated. Another claimed feature of the Elliott painting system is that it will not cause the paint to chip.

Helical Shock Absorber

A new type of shock absorber has been brought out by the Helical Shock Absorber Co., Louisville, Ky. The feature of the newcomer is that it employs a helical screw operating inside a revolving bronze nut. In external appearance it is somewhat like some of the spring-type absorbers, but here all the working parts are dust-protected by a collapsible leather hood. The attachment and working parts of this shock absorber are shown in Fig. 4, where the helical screw is seen extending down into a steel cup. This cup is two-thirds filled with oil and the vertical movement of the screw causes the oil to feed to the parts. The screw passes through a bronze nut which is mounted pivotally on a steel ball, the latter forming a universal. The top of the screw is attached to a leather universal as shown. This absorber is said to come into action only when the spring is compressed to its

limit in either direction, thus tending to relax suddenly. The spring movement causes the helical screw to turn and so ease the shock. An added feature of this device is the oil channel through the center of the screw as shown in the illustration.

Oxygen Generator and Decarbonizer

One of the latest oxygen-generating plants to come to the market is that made by the Oxygen Generator Co., Troy, N. Y. This apparatus uses as a base a powder called Oxygas, which when heated gives off oxygen. A feature of this device is that it will generate sufficient oxygen for decarbonizing one cylinder, for 14 cents. The apparatus, shown in Fig. 3, is 2½

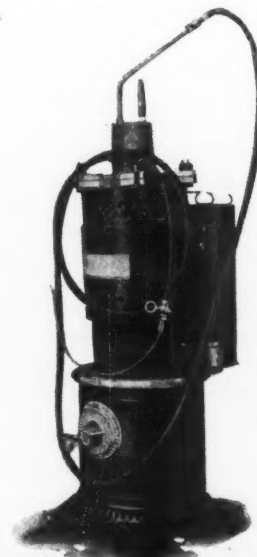


Fig. 3—An oxygen generator which uses as a base a powder called Oxygas

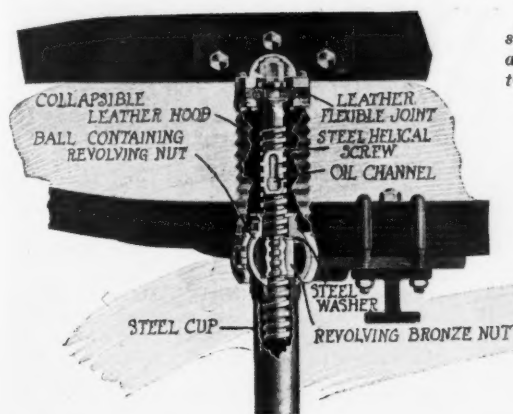
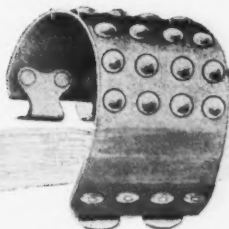


Fig. 4—At the left is shown the Helical shock absorber, which is a new type, using a helical screw. Below is shown the Polson tire band for covering small blowouts



feet high and with three 4-pound cans of Oxygas, sells for \$15. Four pounds of the powder is sufficient for cleaning eighteen cylinders. The generator is made of cast iron and will hold generated gas for weeks without any of the gas escaping, it is claimed. A safety valve prevents excessive pressure injuring the container. An added advantage is that the burner gives off enough heat to keep a moderate-size garage warm.

Ford Combination Tool

A new combination petcock wrench and valve grinder for Ford cars is announced by the New York Coil Co., New York, this tool consisting of a section of tubing knurled at one end and formed into a slot, to be held over the petcock handle, at the other. The shape of the slot is such that the wrench cannot slip off, it is claimed. With this tool is furnished an attachment for grinding valves. The device, shown in Fig. 2, sells for 50 cents.

Polson Tire Band

Polson Bros. Mfg. Co., Kansas City, Mo., are marketing a narrow tire boot, shown in Fig. 4, which is but 3 inches wide and intended for covering small blowouts or unusually large cuts. The band is made of leather with two hooks on each side and has steel studs on the surface to increase the wearing qualities. The 3-inch size sells for 50 cents and the 5-inch for 70 cents. Other tire boots for use outside the casing and inside patches also are marketed together with a special

blowout patch for 3-inch tires, which sells for 35 cents.

Gittatit Pliers

A useful tool in the form of an offset, combination slip-joint pliers is that manufactured by H. D. Smith & Co., Plantsville, Conn. This pair of pliers permits

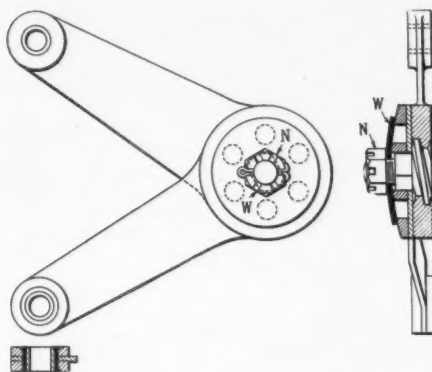


Fig. 5—Laporte scissors-type shock absorber

of work being done which ordinarily would require an additional tool perhaps. It becomes an efficient cotter-pin remover when used as shown at the top in the illustration in Fig. 6, which also shows another use to which it may be put.

Laporte Shock Absorber

A V-type or scissors shock absorber has been brought out by Charles Laporte, Detroit, Mich., which allows of any amount of normal spring action before it comes into play and which need be adjusted but once. This device consists of an upper and lower arm pivoted at the center as shown in Fig. 5. The top arm is threaded to receive an acme threaded screw, which is worked in and out by the lower arm driving it. The action takes place when the screw, being turned radially when the car springs close or open, thereby causes a lateral action of the two arms. On the down stroke of the car, the shock absorber has no effect on the springs, as the screw and nut move outwards, but on the rebound or opening of the springs, the screw and nut move towards each other, causing the lower arm, which slides on the screw, to move out against the rubber washer. The washer W is held firmly by the outside nut N, the amount of com-

pression of this rubber deciding the resistance offered.

Joy Ride Tire Compound

Preventing tube punctures has long been a problem to manufacturers of tire specialties and the latest form of puncture-sealing compound to come to the market is that called Joy Ride, manufactured by the Fiber Mfg. Co., Denver, Colo. This substance in its original state is in the form of a fibrous compound, but when required for use it is placed into a solution of denatured alcohol and water. The mixture is injected into the inner tube of a tire, not wholly filling the tube. It is said to be non-adherent and quick in its action of sealing a puncture. Sufficient Joy Ride for four 4-inch casings sells for \$10 and for over 4-inch tires enough for four fillings sells for \$12.

S. V. Truck Tire

A new pressed-on type of solid truck tire known as the improved S. V. has just been announced by the Goodyear Tire & Rubber Co. The feature of this tire is that there are no accessories needed, such as bands, keys, side flanges or bolts and there is no left or right side. The tread is flat, the base of corrugated channel section and more rubber is now used than previously. The weight of the tire now is less than the weight of the ordinary type with accessories, it is claimed.

El Arco Radiators for Fords

A pointed, V-type radiator for the Ford car is one of the specialties of the El Arco Radiator Co., New York.

Wireless Dash and Trouble Lamp

The H. J. Murphy Co., Reading, Pa., is marketing a combination dash and trouble light for Ford cars, which consists of a pocket flash light, with means of attaching it to the steering post of the car, as shown in Fig. 7. The flash light has a rail B which from all appearances, slips into the rail compartment A. When in position the wireless illuminates the dash. A feature of this lamp is that it may be removed and replaced quickly. It sells for \$1.25 and has the advantages of requiring no wiring and battery trouble as a small dry-cell supplies the current.

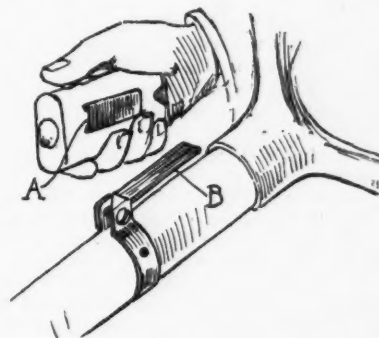


Fig. 7—Wireless dash and trouble light for Ford cars which consists of a pocket flashlight with an attachment for fastening it to the steering post. It is easily removable when desired as an inspection lamp

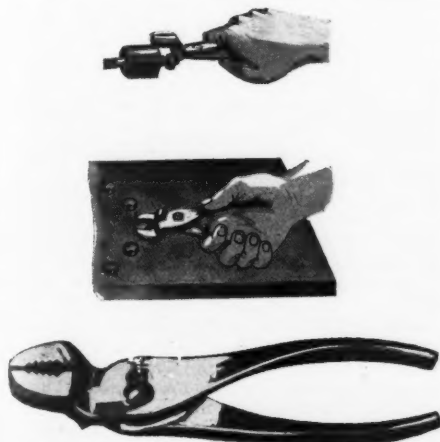


Fig. 6—Gittatit pliers and how it can be used for unusual purposes



From the Four Winds



WICHITA Dealers to Hold Show—Motor car and accessory dealers of Wichita, Kan., have decided to promote a motor show in October and have leased the Forum, Wichita's largest exhibition building, for the display.

More Motor Cars Than Orphans—The Toledo Automobile Club took such an interest in the orphans' day outing which took place in Toledo last week that there were not enough orphans in the three institutions of the county to fill the motor cars or to eat the delicacies provided. Wealthy owners of forty large touring cars were deeply disappointed because there were no children to fill their machines. There were 500 children in the big joy-ride and the Toledo newsboys made up a portion of the procession.

Uniform Signs for Washington—Uniform signs along all the principal roads and highways of Washington is the object sought by State Highway Commissioner William R. Roy and the state highway commission. At a meeting of that board the subject of making all guide signs similar was taken up and it was decided to ask all the various good road clubs of the state for suggestions as to how it can be brought about.

Street Repairs Insisted Upon—The New Haven motorists have hit upon a good plan to insist on repairs being made in the city streets. When they see spots that are neglected and which have been allowed to ravel away without any effort on the part of city officials to make repairs, the motorists get the local papers to take pictures and print stories showing the neglect and this acts as a magical wand in changing conditions for the officials do not relish public criticism of neglect backed up by photographic proofs.

Austin Merchants Adopt Motor Delivery—All of the leading merchants of Austin, Tex., have entered into an agreement for the delivery of their goods by co-operative motor system. The new service will begin operation September 1 and will be under the management of B. F. Cadenhead. Eight delivery cars will be used. It is planned to make four deliveries each day, at 8:30 and 10:30 in the morning and 2:30 and 4:30 in the afternoon. It is claimed that this co-operative method will lessen the cost of delivery service to the merchants.

Too Much Work for Trucks—M. J. McCarthy, who undertook to sprinkle the unimproved streets of Indianapolis with motor trucks, has given up the contract, because he was unable to perform the work. The blame for the failure, however, cannot be laid to the trucks, which as a matter of fact performed efficient service. The trouble was in trying to get too much work out of the trucks, has given up the contract because he eight trucks territory that formerly was covered by more than fifty horse-drawn sprinkling wagons.

Trucks Save Houston Money—The large saving which is being made in Houston, Tex., by the use of motor trucks for gathering and transporting street sweepings and also a motor-driven street sprinkler is attracting much attention on the part of municipal authorities in other cities. When Houston adopted the motor truck system for work of this character, it did away with the service of twenty mules. The saving to the city as compared with the old method is more than \$1,600 per month. There are ten mules still being used and they will be replaced by motor trucks later on. Even with the two motor trucks for keeping the refuse

removed from the streets that are now used it costs the city \$63.60 a day to perform the work on 214 blocks as compared with \$65.70 a day to look after 114 blocks under the old method.

New Touring Mecca Opened—Ferry service for motoring parties has begun across Willapa harbor, Wash., opening up a beautiful section of country on the North Beach peninsula, and National Park highway. The hard level sandy ocean beach has been pronounced the greatest speed highway in the world.

California Spends Most on Roads—During the year 1912 only one state, California, spent more money in road building than Indiana. In that year \$8,877,553 was put into roads and road bridges in the Hoosier state. In California the amount aggregated \$9,902,160. It is estimated that the 1913 expenditures in Indiana, all of which have not as yet been reported, were 10 per cent higher than those of 1912.

Ask Building for Car Exhibits—There is a movement on foot for a permanent building at the Indiana state fairgrounds to house motor car exhibitions, which would be held annually during the fair. It is regarded as likely that the Indiana legislature, next January, will be asked to allow a substantial appropriation for the purpose. During the fair beginning September 7, the Indianapolis Automobile Trade Association will hold a display of motor cars, parts and accessories. This will be held in a large tent and all of the space was taken several weeks ago. Within the last few years, the motor car in-

dustry has become one of the most important in the state. Motor car men are of the opinion the standing of the industry should be given substantial recognition by the state.

Price of Gas Cut in Half—Motor car owners at Goshen, Ind., are enjoying a gasoline price war between the Standard Oil Co. and the Indian Refining Co. It is reported that the retail price of gasoline has been reduced from 18 cents to 9 cents a gallon.

Complete Pacific Highway Stretch—The first stretch of the permanent Pacific highway to be built in Oregon has been completed and opened to traffic. It leads from Medford north 5 miles to Central Point and was constructed by the county by day labor. Every square yard of the roadway was measured and chemically analyzed by experts before being laid. The cost was \$15,000 a mile.

Select Coast Range Routes—The Yosemite to the Sea Good Roads Association held a meeting at Merced, Cal., recently and selected a route over the Coast range, through the San Joaquin and Santa Clara valleys to the coast. The route selected is from Monterey and Pacific Grove through Salinas and San Juan to Hollister, also to Santa Cruz, San Jose and Watsonville to Gilroy and from Gilroy to Los Banos, over the Dos Palos bridge across the San Joaquin River, via Merced, Coulterville and the Yosemite; and also a road from Mariposa via Wawona to Yosemite.

Sells Used Cars on Street—An enterprising dealer in second-hand motor cars has been transforming the downtown streets of Fort Wayne, Ind., into salesrooms for the peddling of his wares. Scarcely a morning in the past week but this dealer has had one or more cars backed up against either Berry street or Court street labeled with "For sale" signs, while he loudly declaimed the merits of the machines to a crowd of prospective customers. Business houses on the other corners at the same street intersections pay hundred of dollars a year for the privilege of using space, which this dealer usurped for nothing.

\$3,524,814 Spent on Minnesota Roads—The biennial report of the Minnesota state highway commission shows cost of work in that period of \$3,524,814, of which \$1,714,854 was spent in 1913. The cost of engineering, supervision and administration of the department was \$269,234, an average of 7.6 per cent on actual construction work, or 5.4 on all work constructed and planned. Surveys, plans and specifications were prepared for 1914 work to cost \$1,500,000. In 2 years 1,663.68 miles of earth road were built, 358.03 miles of sand clay, 490.2 miles of gravel, and 12.76 miles of macadam. There was also clearing and grubbing of 2,142.2 acres.

Carry Camp Luggage in Trailer—Towing a two-wheel trailer loaded with 1,200 pounds of camp luggage behind their five-passenger Buick touring car, Mr. and Mrs. E. C. Williamson, with their four children, arrived in Spokane during the past week from Los Angeles, having made a 2,000 mile run since July 6. The trailer was arranged with a brake appliance so that it could be operated from the driver's seat. The trip up the coast was made along the route of the Pacific Highway via San Francisco, Klamath Falls, Portland and into Spokane by way of Pendleton, Ore. In some places in the mountains the road was so steep that it was necessary to tie the wheels on the trailer.

Coming Motor Events

SHOWS AND CONVENTIONS

September 9-11—Convention of National Paving Brick Manufacturers' Association, Buffalo, N. Y.
September 7—Indianapolis show.
October 5-10—Fall show, St. Louis.
October 7-10—Convention of the Motor Truck Club of America, Detroit, Mich.
October 7-17—Electric vehicle show, Grand Central Palace, New York.
October 17-24—Show, Pittsburgh, Pa.
October 19-21—Convention of Electric Vehicle Association of America, Philadelphia.
November 9-14—American Road Congress, Atlanta, Ga.
January 2-9—New York show.
January 9-16—Philadelphia show.
January 23-30—Chicago show.

CONTESTS

*August 21-22—Road races, Elgin, Ill.
September 5—Track meet, Milwaukee, Wis.
September 7—Track meet, Providence, R. I.
September 9—Road race, Corona Beach, Cal.
*September 12—Track meet, Hamline, Minn.
September 14—Track meet, Milwaukee, Wis.
September 15-16—Track meet, Norfolk, Neb.
September 18-19—Track meet, Hutchinson, Kans.
September 18-26—Track meet, Springfield, Ill.
October 2-3—Track meet, Oklahoma City, Okla.
October 2-3—Track meet, Trenton, N. J.
November 8-11—Track meet, Shreveport, La.
November 15—Kerosene motor tests, Paris, France.
November—El Paso-Phoenix road race.
November—Los Angeles-Phoenix road race.
November—Albuquerque-Phoenix road race.
November—Track meet, Phoenix, Ariz.

*Sanctioned by A. A. A.



Among the Makers and Dealers



NEW Canadian Sales Manager—J. A. Martin, for the past 4 years manager of the Vancouver branch of the Russell Motor Car Co., has been appointed sales manager for Canada.

Joy Head of Bank Board—Henry B. Joy, president of the Packard Motor Car Co., has been appointed head of group 2 of the federal reserve bank board, in district No. 1, with headquarters at Chicago.

Selling Pope Machinery—Colonel George Pope, receiver of the Pope Mfg. Co., is selling off the machinery in small lots. The sale of several parcels was authorized last week by the judges of the superior court. The factory is to close down August 20 when all operations will stop.

Cyclecar Displays at National Shows—At the national motor shows to be held in New York and Chicago, January 2-9 and January 22-30 respectively, it is the intention of S. A. Miles, manager of both shows, to give prominence to the cycle, light and small car industry, by setting aside a section commensurate with the desires of the manufacturers in this field.

Swartz Company Elects Officers—The Swartz Carburetor Co., which was incorporated recently with an authorized capital of \$50,000, has been organized by the election of the following officers: M. A. Corbett, president; Thomas A. Swartz, vice-president; R. J. Corbett, secretary, and F. E. Stevens, treasurer. The company will make a carburetor invented by Thomas A. Swartz which is claimed to give greater mileage and also to be more flexible than existing carburetors. The factory will be located in Columbus, O.

Atwater Kent Issues Warning—A. Atwater Kent, manager of the Atwater Kent Mfg. Works, has been awarded the sole right to use the word "Unisparker" as a trade mark and an alternative for the Atwater Kent ignition system. This name has at times been copied or closely imitated by other makers of ignition device, it is claimed, and the Atwater Kent company declares that any use of the word "Unisparker" as referring to any other than Atwater Kent ignition equipment constitutes an infringement of trade mark rights and will be prosecuted.

Fight Over Michigan Buggy Co. Bids—Charles B. Hays, of Kalamazoo, Mich., has made a bid of \$45,000 to the Detroit Trust Co., trustee, for the bankrupt Michigan Buggy Co.'s property. Some time ago it was stated by the trust company that the bid of \$40,000 made by T. Willard Ready, of Niles, O., was being considered, but had not been accepted definitely. Ready now declares that his bid was practically accepted by the trust company and says he will not return the abstracts. The matter has been referred to the federal court to decide whose bid should be accepted.

Truck Convention in Detroit—The Motor Truck Club of America will hold a national convention in Detroit on October 7, 8, 9 and 10 to which ten other commercial vehicle associations have been invited. The meetings will be held in the convention hall of the Cadillac hotel which seats 1,000. There will be no admission fee and no exhibits and owners are especially invited to attend. The first day of the convention will be manufacturers' day; the second, dealers' day; and the third and fourth, get-together days. At a meeting of the trade last week, the following committee chairmen were appointed: C. R. Norton, Packard, general committee;

M. L. Pulcher, Federal, finance committee; E. D. Anderson, Anderson, electric truck committee; R. B. Spencer, Denby, publicity committee. The program is in the hands of the regular club committee.

Tractor Plant Damaged by Fire—The plant of the Killen-Strait Mfg. Co., Appleton, Wis., gas tractors, was damaged about \$2,500 by fire of unknown origin recently. Repairs are being hastened and operations were delayed only slightly. The company is putting out five tractors weekly.

Starts Shipments of 1915 Models—Shipments of the 1915 Hupmobile models were started August 11, according to Superintendent S. H. Humphries, of the Hupp Motor Car Co. During the first 10 days only 35 cars will be the daily output, but after that time the output will be doubled.

Scheu Out of Euclid Company—E. A. Scheu, president and general manager of the Euclid Motor Car Co., New York, has tendered his resignation and severed all connections with the company. He intends to take a short vacation, and has made no announcement regarding his future plans.

Packard Employees in Annual Outing—The annual outing of employees of the Packard Motor Car Co. was held at Bob-Lo, August 10. About 6,000 of the company's working force took part and three of the largest Detroit River steamers were used to transport the crowd to Bob-Lo. The features of the day were the various athletic contests.

New Company Elects Officers—The election of officers of the Monroe Motor Co., which was organized last week at Flint, Mich., has taken place. R. Monroe, is president and general manager; W. C. Durant, vice-president; A. G. Bishop, treasurer; Curtis R. Hathaway, secretary. W. C. Rowles, R. F. Armstrong and A. B. C. Hardy, together with the officers, make up

the board of directors. F. C. Finkenstead, Bay City, Mich., is one of the stockholders. Practically the entire stock of \$250,000 is held, so it is claimed here, by the four officers of the company.

No Crude Rubber, Tire Plant Closed—Owing to the shortage of crude rubber the plant of the United States Tire Co., at Hartford, Conn., has closed down. Operations, it is said, will not be resumed until the crude product can be obtained.

Myers Quits Stutz Job—W. D. Myers, for the past 3 years sales manager of the Stutz company, has resigned his position. It is expected that he will enter the retail end of the motor car business.

Pittsburgh Dealer is Killed—Martin H. Averman, president of the Averman-Lynn Co., Inc., motor car distributor of Pittsburgh, was killed on the evening of August 6 when his machine overturned on the Evergreen road. The car contained three other passengers, all of whom were seriously injured.

Dixon Leaves McFarlan Company—A. Dixon, for several years sales manager of the McFarlan Motor Co., Connersville, Ind., has resigned to accept the position of district manager for the Kritt Motor Car Co. and will make his headquarters at Omaha, Neb. Mr. Dixon will have charge of a wide territory covering several states, for the Kritt company.

Large Addition to National Plant—Plans for a large addition to its plant in Indianapolis are being made by the National Motor Vehicle Co. A large tract of ground adjacent to the plant has been purchased and construction work will be started as soon as plans can be completed and contracts let. The company has just increased its capital stock to \$600,000, which gives the company \$300,000 of preferred and \$300,000 of common stock.

Recent Incorporations

Albany, N. Y.—Tube & Tire Co., capital stock, \$200,000; incorporators, C. G. Roth, F. Fuller, J. S. Heep.

Auburn, N. Y.—W. S. Curtis, capital stock, \$10,000; garage and motor car business; incorporators, W. S. Curtis, R. S. Messenger, H. A. Ferguson.

Batavia, N. Y.—Killeen-Green Co., capital stock, \$4,000; garage and motor car business; incorporators, P. J. Killeen, J. E. Killeen, P. M. Green.

Boston, Mass.—Boston Sales Co., capital stock, \$48,000; incorporators, C. P. Derby, G. C. Shean, E. J. Sanderson.

Chicago—North Side Buick Sales Co., capital stock, \$8,000; to deal in motor cars; incorporators, H. Weil, H. J. Rosenberg, H. J. Lurie.

Cleveland, O.—Automatic Lifting Jack Co., capital stock, \$50,000; to manufacture motor car supplies; incorporators, T. H. Wittliff, C. W. Parker, C. M. Deadwyler, F. M. Wittliff, J. A. Wortman.

Conway, Mass.—Patterson Auto Co., capital stock, \$4,000; incorporators, A. J. Patterson, L. C. Germalin, W. M. Alden.

Covington, N. Y.—Kenton Motors Co., capital stock, \$10,000; incorporators, E. J. Rouse, L. E. Booth, M. R. Etheredge.

Cushing, Okla.—Hillman Refining Co., capital stock, \$15,000; incorporators, C. F. Hillman, H. Askin, C. R. Edgecomb, J. E. Irson, Y. H. Clanssen.

Detroit, Mich.—Home Service Co., capital stock, \$1,200; to deal in and manufacture motor cars; incorporators, R. C. Semon, L. Diebel, J. B. Dale.

Detroit, Mich.—Michigan Lubricator Co., capital stock, \$200,000; to make lubricators and devices; incorporators, J. B. Corlis, J. B. Corlis, Jr., C. D. Corlis.

Detroit, Mich.—General Garage Co., capital stock, \$5,000; incorporators, Frank Boydell, Florence Boydell, J. G. Wood, B. Wood.

Dover, Del.—Bay Tire Protector Co., capital stock, \$100,000; to manufacture motor cars; incorporators, F. R. Hansell, George Martin, E. T. Vennel.

DuQuoin, Ill.—Southern Illinois Motor & Lumber Co., capital stock, \$25,000; to deal in motor cars and lumber; incorporators, J. H. Ward, R. W. Eddleman, R. C. Easton.

Enid, Okla.—Oklahoma Auto Bus Co., capital stock, \$1,000; incorporators, F. J. Gentry, C. E. Pendleton, L. G. Pendleton.

Geneva, N. Y.—Seneca Motor Car Co., capital stock, \$25,000; incorporators, A. G. Lewis, G. M. Chase, C. E. Hamilton.

Greenwich, Conn.—Allen Brothers Garage, capital stock, \$50,000; incorporators, F. H. Allen, H. W. Allen, F. J. Holmes.

Kansas City, Mo.—W. S. Hathaway Motor Co., capital stock, \$15,000; to manufacture and repair motors; incorporators, W. S. Hathaway, H. C. Page, G. L. Hathaway.

Lawrenceville, Ill.—Maxwell Car Co., capital stock, \$200,000; incorporators, A. L. Maxwell, C. L. Lewis, N. M. Tohill.

Lowell, Mass.—F. E. Stowell, capital stock, \$5,000; incorporators, M. L. Stowell, F. E. Stowell, J. S. Stowell.

Mount Vernon, N. Y.—Bartlette Distributing Co., capital stock, \$10,000; to deal in motor cars.

New York—Steel Pneumatic Tube & Tire Co., capital stock, \$200,000; to deal in tires; incorporators, J. S. Heep, F. Fuller, C. O. Roth.

New York—Lee Tire & Rubber Co., capital stock, \$20,000; incorporators, H. E. Field, A. A. Garthwaite, J. J. Watson, Jr.

Norwalk, Conn.—O. H. Banks Co., capital stock, \$25,000; incorporators, I. T. Banks, M. McShane, G. Hughes.

Fine Bluff, Ark.—Studebaker Corp., capital stock, \$10,000; to handle Studebakers; incorporators, L. B. Bracken, C. H. Montague.

South Bend, Ind.—Co-Operative Consumers' of Fort Wayne Co., capital stock, \$5,000; to deal in motor car supplies; incorporators, A. L. Jacobs, R. Wilkening, R. R. Shuman.

Syracuse, N. Y.—Brewster Brothers, capital stock, \$1,000; incorporators, H. A. Brewster, F. L. Brewster, Wm. D. Brewster.

Waterloo, Ia.—Dart Motor Truck Co., capital stock, \$600,000; incorporators, C. W. Hellen, W. Galloway, C. C. Wolf.



Brief Business Announcements



CADILLAC, Mich.—A garage and repair shop has been started at 604 North Mitchell street by A. Pitman.

Bear Lake, Mich.—A garage and blacksmith shop is being erected here for Louis Irwin, who wants to handle a low-priced car.

Three Rivers, Mich.—A garage has been opened in this town by Edward Lockwood. It is next to the Palmer blacksmith, which also is owned by him.

Cleveland, O.—The Cleveland Auto Tire and Repair Co., Euclid avenue and East One Hundred and Seventh street, has secured the agency for Mohawk tires.

Columbus, O.—Another change has been made in the ownership of the Neil Auto Liv-ery Co., Columbus, Cletus Weinman having purchased the interests of Joseph Hogan in the concern.

Indianapolis, Ind.—The Automobile Tire Co. has been organized here and has located at 34 Jackson Place, opposite the main entrance of the union railway station.

Sioux City, Ia.—W. J. Sutcliffe has disposed of his interests in the Waterloo Auto Supply Co., of Waterloo, Ia., and has taken the local agency for the Reo, doing business under the name of the Sutcliffe Reo Auto Co.

San Antonio, Tex.—J. W. Collins and John L. Clem, Jr., have organized the Collins-Clem Auto Co., to handle the Studebaker. Show-rooms have been opened at 736 East Houston street. Mr. Clem will retain his interest in the San Antonio Auto Supply Co.

Brillion, Wis.—The Calumet Garage Co., Brillion, Wis., has been purchased by Edward Colyar of Manitowoc, Wis., and Adolph Valesky of Collins, Wis., who will continue the business under the style of Brillion

Garage. The concern will distribute the Overland in this territory.

Jackson, Mich.—The Phillips Machine shop and garage has recently been organized here and is located at North Jackson and Van Buren streets.

Philadelphia, Pa.—Leslie H. Curtis, of Crisfield, Md., has been appointed by the Crow Motor Car Co., district manager for its line in the Philadelphia territory.

Boston, Mass.—C. W. Bergman, who has conducted the Joslin House garage on Main street since it was opened 2 years ago, sold the business last week to Herbert Johnson.

Anderson, Ind.—The Remy Electric Co., of Anderson, Ind., recently opened new service stations with D. F. Holiday & Co., 344 N. Delaware street, Indianapolis, Ind.; Perry-Mann Electric Co., Columbia, S. C., and Washington Auto Supply Co., Seattle, Wash.

Indianapolis, Ind.—Charles W. Horne who traveled in the middle western states for the Gibson Auto Co., has been transferred to Birmingham, Ala. R. A. Beck who traveled for the same company in southern territory has been transferred to southern Illinois.

Marshfield, Wis.—Frank Zetter, of Marshfield, Wis., has purchased a half interest in the Koehler garage, West Second street, Marshfield, and formed a partnership with the owner, William Koehler, under the style of Independent Garage Co.

Hartford, Conn.—The Colonial Automobile Co. has been organized and is located at 1279 Main street. The company will carry the Studebaker in Hartford, Tolland, Windham and Middlesex counties. W. M. Turnbull, until recently with George D. Knox,

the Hudson and Peerless distributor, is to manage the new concern.

Fulton, Mo.—H. Bangs has opened the Fulton garage here on the state highway between St. Louis and Kansas City.

Corona, Cal.—W. L. Peeler has purchased the interests of his partners in the Crown Garage and Machine Works and is now sole owner of the local Studebaker agency.

Indianapolis, Ind.—J. Groves Cohen, formerly with U. S. Motors and Locomobile, has joined the sales department of Nordyke & Marmon Co., Indianapolis, and will travel the south in the interest of the Marmon.

Superior, Wis.—The Motorcraft Store, 1716-1718 Broadway, Superior, Wis., is the name of a new establishment opened August 1 by A. C. Eveland & Co. The store carries a large stock of motor car accessories, tires, etc.

Toledo, O.—Thomas J. Harris has purchased the interests of his partner, Orrie E. Starr, in the business of the Knight Rubber Co., 810 Madison avenue, which now makes him sole owner of the concern. Mr. Starr will go to Akron, O., where he has a position with a rubber company.

Toronto, Can.—E. P. Clarkson has been appointed Toronto district representative for Dodge Bros., Detroit. Mr. Clarkson's appointment means that he will have charge of Dodge Bros.' sales throughout the Dominion of Canada, dating from August 1, 1914.

San Francisco, Cal.—The Paige Motor Car Co., Detroit, Mich., has closed arrangements for the handling of its line in California for the coming season. Don Lee, with selling branches in this city and in Sacramento, Oakland, Fresno, Pasadena and Los Angeles, will handle the Paige.

RECENT AGENCIES APPOINTED BY MOTOR CAR MANUFACTURERS OF PASSENGER CARS

Town	Agent	Make
Abbeville, S. C.	A. M. Stone	Cole
Armstrong, Ia.	R. E. Bunt	Herff-Brooks
Allentown, Pa.	V. H. Steckel	Herff-Brooks
Aurelia, Ia.	Samuel Jordan	King
Alliance, Ohio	Alliance Motor Supply Co.	King
Brockton, Mass.	Geo. E. Tuscan	Herff-Brooks
Blankston, La.	Hopewell Planting Co.	Herff-Brooks
Boston, Mass.	Artemas Ward	King
Brownwood, Tex.	Jos. Hall	King
Bridgeport, Conn.	Fairfield Auto Co.	Herff-Brooks
Boston, Mass.	David Houston	R. C. H.
Chester, Ia.	Jones Hardware Co.	Herff-Brooks
Clinton, Ill.	Arthur Shaw	Herff-Brooks
Centralia, Ill.	Centralia Garage & Vulcanizing Co.	Cole
Cleveland, O.	Brandt Motor Car Co.	Herff-Brooks
Chapman Quarries, Pa.	Roberts Motor Car Co.	Herff-Brooks
Darlington, Wis.	H. J. Gallagher	King
Oelwein, Ia.	J. C. Knapp	Cole
Deer Plain, Ill.	R. L. Meyer	Cole
Duck Hill, Miss.	E. E. Wilkins	King
Drexel, Mo.	C. H. Pault	Cole
Decatur, Ill.	Rehling Bros.	Herff-Brooks
Fort Wayne, Ind.	Ohnhaus Automobile Co.	King
Fort Scott, Kans.	Central Garage	Cole
Ft. Madison, Ia.	W. A. Arnold	Herff-Brooks
Garnett, Kans.	J. J. Anderson & Son	Cole
Gering, Neb.	C. C. Hampton	Franklin
Hanover, Pa.	D. B. Lau	Herff-Brooks
Harrisburg, Pa.	J. K. Klipp	Herff-Brooks
Ithaca, N. Y.	F. A. McClune	Franklin
Jerseyville, Ill.	Wm. Sheppard	Cole
Lancaster, Pa.	Samuel K. Landis	Herff-Brooks
Lestershire, N. Y.	Chas. H. Wakeman	King
Luana, Ia.	G. F. Lindroth	Herff-Brooks
Little Rock, Ark.	Shoemaker-Bale Auto Co.	King
Lincoln, Nebr.	A. B. A. Auto Co.	Herff-Brooks

Town	Agent	Make
Manhattan, Kans.	Hiner & Paige	Cole
Minneapolis, Minn.	Morton-Bronn Motor Co.	Moline
Mahomet, Ill.	Geo. W. Carter	King
Meridian, Miss.	E. S. Bostick	King
New Salem, N. D.	Schultze & Toppins	King
New York City	Artemas Ward	King
Omaha, Nebr.	A. B. A. Auto Co.	Herff-Brooks
Old Fort, O.	C. C. Drown	Herff-Brooks
Oswego, N. Y.	Ontario Motor Car Co.	Herff-Brooks
Port Byron, Ill.	S. R. Wainwright	King
Paola, Kans.	C. C. Hoover	Cole
Pontiac, Mich.	Pontiac Motor Sales	King
Princeton, Minn.	S. P. Skahon	Cole
Pulaski, Penn.	John M. Reed	Cole
Quincy, Ill.	Great Western Motor Sales Co.	King
Sedalia, Mo.	Richmond Motor Car Co.	Herff-Brooks
Sioux City, Ia.	Adams Auto Co.	Herff-Brooks
St. Paul, Minn.	C. & S. Motor Car Co.	Lewis
Schenectady, N. Y.	W. W. Primmer	Herff-Brooks
Swift Current, Can.	Wright & Mitchell	King
Shenandoah, Ia.	Franklin Car Co.	Franklin
Swampscott, Mass.	Harry M. Doane	Herff-Brooks
Starksville, Miss.	D. O. Slaughter	Cole
Toledo, Ohio	Maumee Motor Car Co.	King
Tulsa, Okla.	Chapple Brothers	Cole
Utica, N. Y.	L. J. Zobel	Herff-Brooks
Versailles, Mo.	Crewson & Moness	Cole
Walterboro, S. C.	Walterboro Garage	King
Washington, Ill.	Washington Garage	King
Worcester, Mass.	F. B. Williams	Franklin
Waterloo, Ia.	Wagner-Wood Auto Co.	Herff-Brooks
Wyaconda, Mo.	Kerner Bros.	Herff-Brooks
Waverly, Ia.	C. Hohnsbehn	Herff-Brooks
Vincennes, Ind.	W. A. Miller	Cole
Youngstown, Ohio	J. Ralph Seidner	King
Yates Center, Kans.	Stell Brothers	Cole

EISEMANN

Insofar as the automobile industry itself is concerned Eisemann ignition systems perform a double function—they not only represent the acme of efficiency, dependability and durability in their mechanical performance, but through this performance they become a potent selling factor.

To the pleasure car owner they represent the greatest degree of comfort because of the mere fact that under the hardest tests of service they perform best.

To the commercial vehicle operator they represent great saving both in time and operating cost. First because by being efficient, dependable and durable they obviate the necessity of care and attention, and in the second place because of their inherent characteristics they assist materially in the economical operation of the truck insofar as fuel and oil costs are concerned.

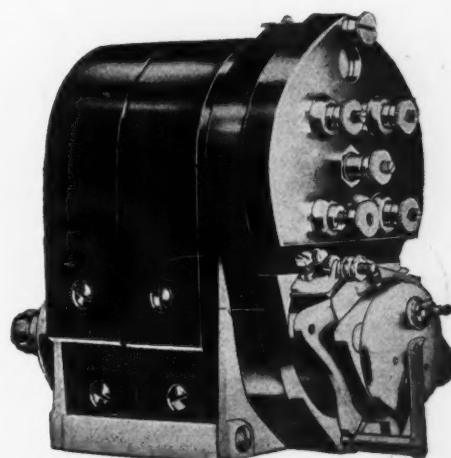
Eighty-three manufacturers of motor driven apparatus in the United States show their conviction of the truth of this statement by depending upon Eisemann for their regular ignition. Of these eighty-three manufacturers fifty are producers of trucks.

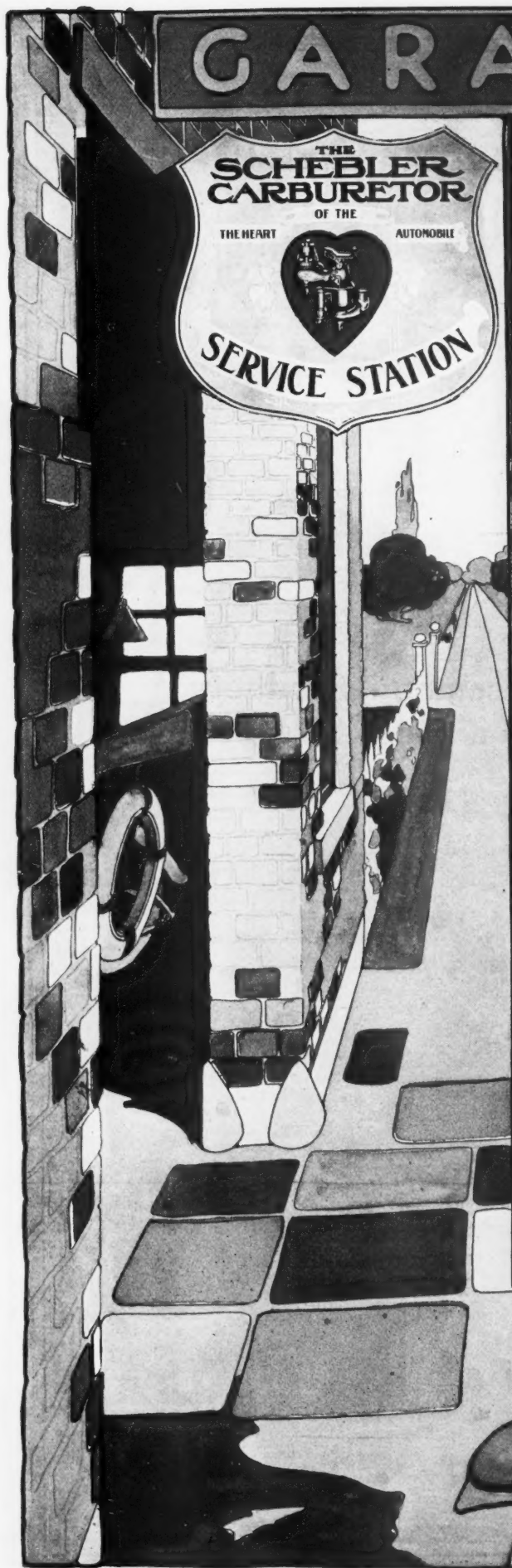
The Eisemann Magneto Co.

Sales and General Offices
32-33d St., Brooklyn, N. Y.

New York Indianapolis, Ind. Detroit, Mich.
123 W. 52d St. 514 N. Capitol Ave. 802 Woodward Avenue.

Eisemann Products as a Sales Asset





"Symbol of Real Service"

You will notice it prominently displayed in front of Schebler Service Stations located in the principal cities of the United States. You will see it as you tour through Canada, through England, Australia, Europe, Asia.

It will direct you to the care and courtesy of a seasoned carburetor expert who has either received his training at our factory or proven his efficiency to the satisfaction of our engineers. It is a guaranty that your Schebler will not be tinkered with by a novice.

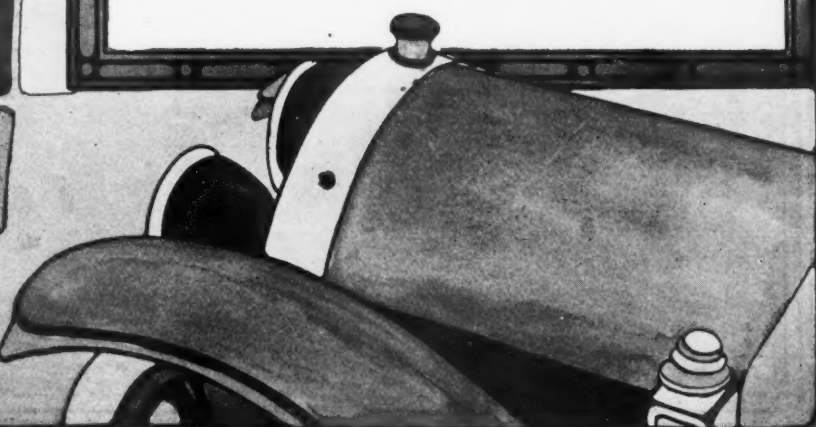
You will find the "Symbol of REAL Service" displayed by the following Schebler distributors:

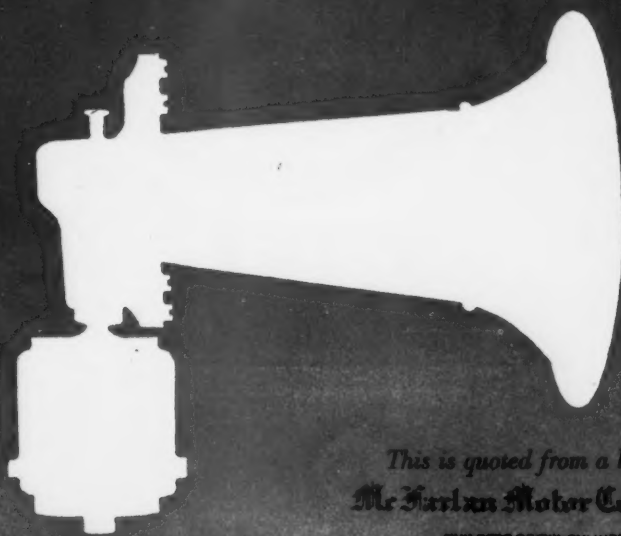
The Automobile Accessories Co...Pittsburgh, Pa.
 The Equipment Company.....Kansas City, Mo.
 Ferris-Dunlap Auto Supply Co....Dallas, Texas
 Fry & McGill Motor Supply Co....Denver, Colo.
 Interstate Electric Co., Ltd....New Orleans, La.
 Pennsylvania Rubber & Supply Co..Cleveland, O.
 Manufacturers' Supplies Co.....Philadelphia, Pa.
 Reinhard Brothers Co., Inc....Minneapolis, Minn.
 Canadian Fairbanks-Morse Co., and all principal Canadian Cities.

W. J. Connell.....Boston, Mass.
 Fred Campbell.....St. Louis, Mo.
 Herring Motor Co.....Des Moines, Ia.
 Jas. C. Nichols Co., Inc.....New York, N. Y.
 Elyea-Austell Co.....Atlanta, Ga.
 Wheeler & Schebler.....Detroit, Mich.
 Wheeler & Schebler.....Chicago, Ill.
 Weinstock-Nichols Co.....San Francisco, Cal.
 Weinstock-Nichols Co.....Los Angeles, Cal.

Wheeler & Schebler

Indianapolis, Ind.





This is quoted from a letter by
McFarlan Motor Company

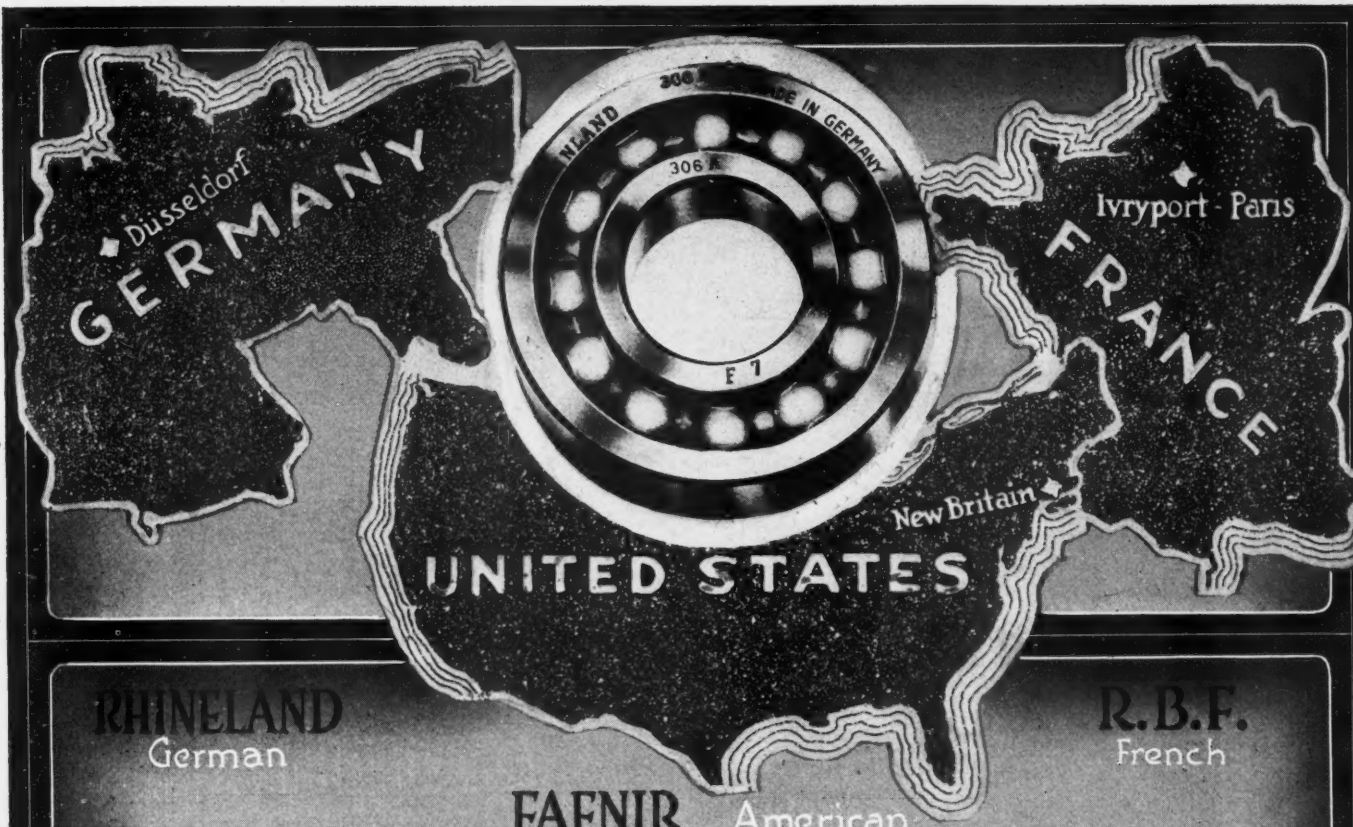
BUILDERS OF SIX CYLINDER
AUTOMOBILES EXCLUSIVELY

Camersville, Indiana

"For years every car owned within this organization has been Klaxon equipped and we know from experience that not only is it entirely adequate as a warning signal, but also it seems to be trouble-proof from a mechanical standpoint.

"This season we are ransacking the accessory field for the absolute best for the McFarlan equipment and can say with all sincerity that no other warning signal was even considered."

LOVELL-McCONNELL MFG. COMPANY
Makers of the "KLAXON" Newark, N.J.



FAFNIR American

BALL BEARINGS

FACTORIES IN THREE COUNTRIES

Insurance for Builder & User
Universal Use & Reputation

Strikes, Fire, Flood or War Cannot Stop Deliveries

We will serve the trade as always, fortified by our American factory, together with our large stock of *Imported Bearings and Materials.*

FAFNIR BEARING COMPANY, New Britain, Connecticut

MASCHINENFABRIK "RHEINLAND," A. G., Duesseldorf, Germany

SOCIETE FRANCAISE DES ROULEMENTS A BILLES, Ivry, (Seine) Paris, France

RHINELAND MACHINE WORKS CO.

1737 Broadway, New York



When Writing to Advertisers, Please Mention Motor Age.



Cheap Clothes
When New
May Imitate
Good Ones
But They Soon
Become Misfits

Imitations Are Always Misfits



When You Buy a Car
Look on the Battery
For the Trade-Mark



It proves that the Storage Battery is absolutely right and is a good indication that in the other parts of the car there are no misfits. Appearances are deceiving. Other Batteries have been made to look like the **LBA**. Don't judge by appearance.

*Insist on seeing the **LBA** Trade-Mark*

Willard Storage Battery Company Cleveland, Ohio

New York Branch: 228-230 W. 58th Street
Chicago Branch: 2241 Michigan Avenue

Indianapolis Branch: 318 North Illinois Avenue

Detroit Branch: 736-740 Woodward Avenue
San Francisco Branch: 821 Monadnock Building

SERVICE STATIONS IN ALL PRINCIPAL CITIES IN THE UNITED STATES, CANADA AND MEXICO

(112)

When Writing to Advertisers, Please Mention Motor Age.

There's no leak proof ring but the **LEAK-ROOF** Ring — insist

What Badly Fitting Piston Rings Are Costing You

Badly-fitting rings mean leaky rings. Leaky rings cause fuel waste because of poor compression—increasing wear due to rapid deterioration of lubricating oil where either gasoline or gasoline vapor is allowed to get into it—eventually breakage of parts as the looseness of the piston head develops—constant carbon trouble.

If you object to waste—to paying full prices for short measures—whether in fuel or motor wear—you will equip your engine with

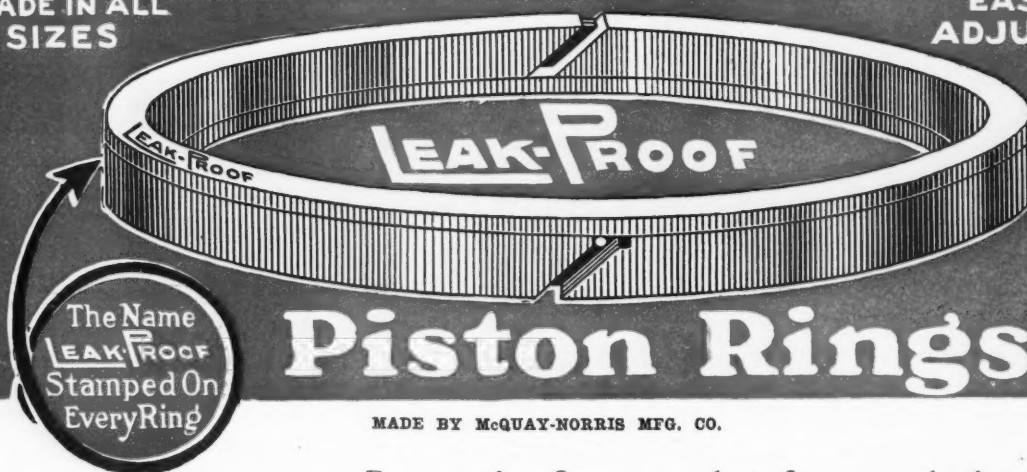


Pinning the Ring

One of the exclusive features about the **LEAK-ROOF** Piston Ring is the concentric interlocking construction of the halves or sections. These are held in proper opposition to each other by means of a small brass pin inserted in the flange of the inner ring. The operators in the picture are engaged in boring the pin hole, inserting the pin and filing it down. It isn't the quickest way to have the job done—but it's the most exact way—the **LEAK-ROOF** way.

MADE IN ALL
SIZES

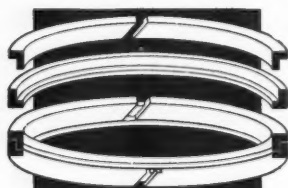
EASILY
ADJUSTED



Piston Rings

MADE BY McQUAY-NORRIS MFG. CO.

Because they fit—are made to fit so exactly that perfect bearing is secured. They have no unsealed openings and any leakage up or down, gas or oil, is rendered impossible. These rings are not rigid, heavy collars hung around the piston head. They are sturdily elastic, delicately adjusted parts, made of special metal from our exclusive formula, ground and polished to within a one-thousandth inch of gage. Are wonderfully strong and enduring besides.



Send for Free Booklet

It tells about piston rings and why you should equip your engine with the **LEAK-ROOF**. How it will pay you in fuel economy and prolonged motor life. Write for it.

*In Use on
Over 200,000 Automobiles
and Motor Boats*

"Ask the User"



PISTON HEAD PACKING RINGS

Manufactured by

McQUAY-NORRIS MANUFACTURING CO., Dep't. M,

St. Louis, Mo.

New York—1919-29 Broadway at 64th St.
Pittsburg—7620 Tloga St.
Kansas City—513 New Nelson Bldg.

Chicago—Suite 718 Michigan Blvd. Bldg.,
Michigan Ave. and Washington St.
San Francisco—164 Hansford Bldg.

Los Angeles—224 Central Bldg.
Canada—W. H. Banfield & Sons,
No. 120 Adelaide St. West, Toronto.

4-A

Look for the name **LEAK-ROOF** stamped on the Ring

When Writing to Advertisers, Please Mention Motor Age.

DENBY

A Truck Announcement

ffering an
opportunity
for a continuous
and profitable
business founded
upon a proved
basis for success.



The Denby Motor Truck

THE questions you will immediately ask are—What is this Denby Truck? Is it a new Truck? Who are the men responsible for it? Is the Company behind it big, powerful and efficient? What about the opportunity it presents the dealer for a large and profitable business?

In this first public announcement we are going to answer these questions:

THE Denby is a 1500 Pound Truck — designed, built and backed by men who have proved by their records that they know the motor truck field thoroughly. They have built into the Denby the experience of years and now confidently present this vehicle as the finished product of the best engineering experience in the commercial car field.

IS the Denby a new truck? The last page of this announcement will answer this question. The constructive and engineering ability of the men whose names are listed there are embodied today in thousands of successful motor-trucks. Any company would be proud of their cooperation. And it is the combined ability of these men—tried and tested through the years—that has made the Denby truck. Only in name is it "new"—and even the name is one that to dealer and public already stands for high ideals in motor-vehicle construction.

WHO are the men responsible for it? This is a question that almost any dealer of experience can answer for himself after reading their names. They are men who have been actively identified with some of the greatest successes in both the pleasure and commercial-car field. Many of them have grown up with the industry from its early days and their names are among those who have made history in the industry. In designing and building the Denby truck these men did not have to guess—they **knew**. For the Denby truck is not a creation of an over-night idea. It is the fruition of years of study into the question of which was the most productive field for the truck manufacturer and dealer; and what points of design and construction were essential to satisfy to the uttermost degree the requirements of that field.

IS the company behind the Denby big, powerful and efficient? To every dealer this is an exceptionally important question. He wants to identify himself with men of whose financial stability and business integrity there can be no doubt. He wants to **know** that the manufacturer of the car he sells will not only give him the car to defeat competition, but will stand behind him through the years of increasing business. Back of the Denby Motor Truck Company are men whose combined resources are reckoned in millions of dollars. So much for their financial standing. But the

dealer is interested in more than that. There have been too many companies whose interest in the sale of a truck ended when the dealer paid for it. Denby trucks will be handled on an entirely different basis for they will be sold **through** the dealer and not **to** the dealer. In other words, we have prepared and will put into effect the most thorough and comprehensive cooperation with the dealer that has ever been attempted in the sale of motor vehicles. We consider that our responsibility for a Denby truck has only begun when it leaves the factory, instead of ending there; we know that ultimately the success of our dealers will depend upon the satisfaction which owners of Denby trucks derive from their use; we know that the additional sales of Denby trucks in each locality will be great or small according to the reputations which trucks make for themselves; and it will be our effort not only to assist the dealer in making sales but to advise the buyer how to use his truck to best advantage so as to derive the utmost benefit and profit from it.

WHAT about the opportunity the Denby Truck presents the dealer for a large and lucrative business? Every well informed dealer will admit that the field for an efficient 1500 pound truck is practically limitless. But in order to meet the demand in this field the salesman must have exact data concerning delivery problems and their solution. This information will be furnished Denby dealers by a corps of efficiency engineers who have

made a study of applications of this vehicle to all kinds of hauling and delivery problems—engineers whose sole duty will be to create sales—big sales—for dealers who represent the Denby. That kind of sales help is bound to make the Denby the best selling proposition on the market. Added to this—the remarkable increase in the Motor Truck business and the tremendous interest in haulage and delivery economies and efficiencies all over the country, there is a field here for every dealer to make big money and build big business. The Denby Motor Truck Co. has started manufacturing on a large production basis. Our resources enable us to produce a value for the price that would be impossible with a smaller output. We are therefore in a position to make a very satisfactory arrangement with a limited number of dealers.

IT is our intention to give every interested dealer an opportunity to identify his business with us on one basis only—that we have the privilege of investigating his ability and business organization—the same privilege we extend to him. We desire the most capable representatives in the country, men who will become co-partners with us in our business, as their and our interests will be identical.

Read the list of officers and directors on the following page. They are a body of men of whom we are justly proud.

Then write today for Folder B.

Denby Motor Truck Co., 22 Dubois St., Detroit, Mich.



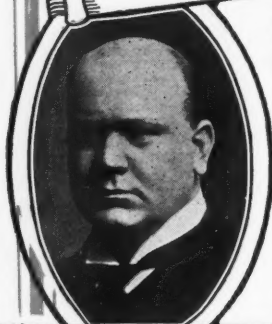
J. WALTER DRAKE—Vice-President
Formerly Director of the Federal Motor Truck Co.; President, Hupp Motor Car Co.



GARVIN DENBY—President
Formerly Secretary and Treasurer of the Federal Motor Truck Company; Director of the Century Electric Car Company; Director of Hayes Manufacturing Company.



ARTHUR WEBSTER—Secretary
Of Chamberlain, May, Denby & Webster, Attorneys.



EDWIN DENBY—Treasurer
Formerly Vice-Pres. and Director Federal Motor Truck Co.; Treas. Hupp Motor Car Co.; Director and Chairman Executive Committee, Century Electric Car Co.

DENBY

A Word or Two About the Men
Who Will Direct the

Denby Motor Truck Co.

We welcome investigation of the Denby Motor Truck Company. Here are a few of the men who will produce and sell the Denby Truck, with a brief outline of their experience.



R. P. SPENCER, Director of Sales
Formerly Sales Mgr. Federal Motor Truck Co.; Formerly Sales and Adv. Mgr. Geuder Paeschke & Frey Co., Milwaukee.



M. E. MCKENNEY—Assistant to Director of Sales
Formerly Asst. Sales Mgr. Federal Motor Truck Co.; Formerly Asst. Sales Mgr. Geuder Paeschke & Frey Co., Milwaukee.



H. L. CONSTANT—Assistant Treasurer
Formerly with Federal Motor Truck Co.



R. F. MOORE—Advertising Manager
Formerly Advertising Manager, Federal Motor Truck Co.



E. L. SCHUMACHER—Efficiency Engineer and Works Manager
Formerly Efficiency Eng'r Federal Motor Truck Co.; Previously Efficiency Eng'r. Geuder Paeschke & Frey Co., Milwaukee, and Westinghouse Elec. Co. of Pittsburgh.

HIGH *and*
LOW TENSION
MAGNETOS



MASTER VIBRATORS
ROAD SMOOTHERS
AUTO LOCKS

With Your Eyes Shut

You Can Safely Buy



ROAD
SMOOTHERS

Reg. U. S. Pat. Off.

Quickly Applied to your Ford Car

Like the Master Vibrator and other K-W Products, K-W Road Smoothers are BUILT UP TO A STANDARD, not down to a price.

Go to your nearest dealer—ask him to show you how the helical spring takes up shock, the air cushion chamber with the carefully made piston checks rebound—how the anti-side motion links prevent side-motion and the chassis from getting out of alignment—how this combination Smooths out the Roughest Roads.

Then tell your dealer to put a set on your car. He will do it promptly, but you don't have to wait and inspect **your** set. We do that at the factory not once, but at every stage of manufacture.

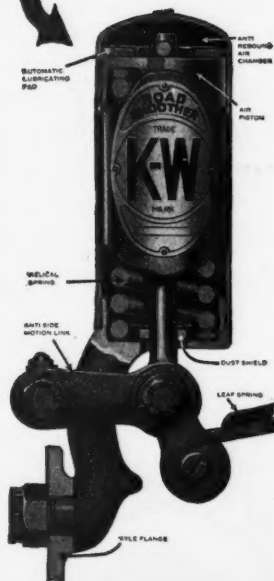
K-W Quality

K-W Road Smoothers are all of one quality and built the K-W way. Of course you get phosphor bronze bushings throughout—high grade heat treated drop forgings and electric smelted vanadium steel springs, but you get far more. You get that K-W guarantee for satisfactory, "no worry" service.—Ask any one of the half million users of K-W products what this service is.

K-W Road Smoothers are sold by dealers who know the difference, everywhere, at one price. Beware of imitations. There is only one Road Smoother. Look for the name K-W Road Smoothers.

**\$25 SET OF FOUR
ONE FOR EACH WHEEL**

If your dealer cannot supply you, sent direct on receipt of price.
Write for booklet, "Taking Out the Bumps."



HEADLIGHTING
OUTFITS

THE **K-W** IGNITION CO.
2835 CHESTER AVE. CLEVELAND, OHIO, U.S.A.

SPARK COILS
SPARK PLUGS

National

New Series "AA" \$2375

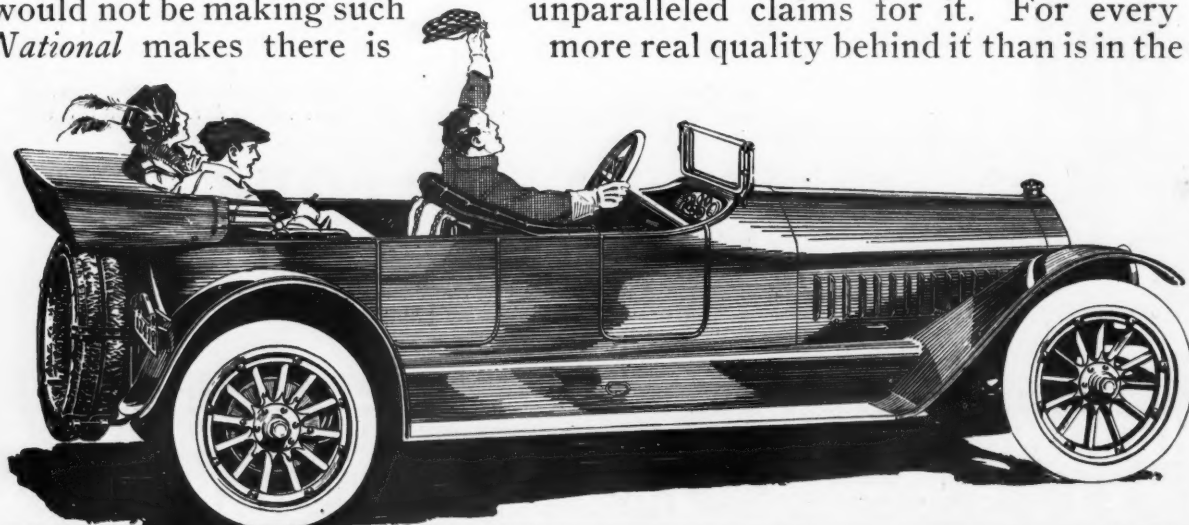
Announcement to Motor Car Dealers

CAR BUYERS know two things today and know them so well that no amount of clever arguments can change their minds. One—that a car can be no more successful than the factory that produces it. Second—that a car can only render the service its quality will permit.

¶ You can not "talk" quality into a car if it is not there. Try it, and see how fast you lose money. You don't have to exaggerate when selling the *National*. The car, and the factory behind it, are ready, willing and able to make good for you.

¶ We know that if certain dealers had the inside knowledge of the automobile situation that we have, they would thank us from the bottom of their hearts—and pocket books. There are things we could tell them here, but if dealers are enough in earnest to "get right" in this business, they will come to us. This is a plain statement of existing facts that every dealer is entitled to be protected by.

¶ We have not said much about the car. But why should we to dealers? Look at the lines, even a glance "sells" you. Then if the reputation of the *National* counts for anything at all, you can rest assured that the "insides" are just as good as the outside. There is one sure way to find out. Come to the factory and we promise you a revelation. If this car was not right in every particular, *National* would not be making such unparalleled claims for it. For every claim *National* makes there is more real quality behind it than is in the claim.





The National's Fifteenth Year of Success

¶ Last year many dealers said, "If we had only known what the *National* had up its sleeve, we would have waited." If you regret that you are not a *National* dealer later in the season, you can't blame us. We are not only announcing this new *National* now in seasonable time, but we are shipping them right now.

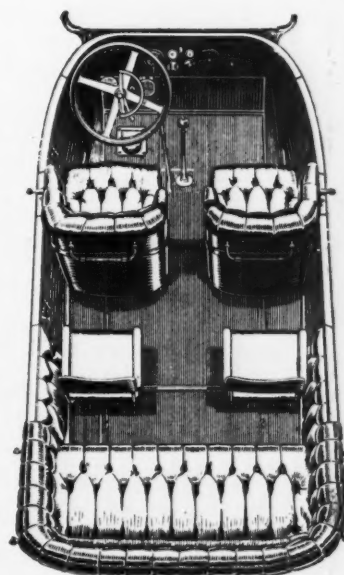
¶ This year is destined to see several things happen in the automobile business. It is inevitable. The sound reputation that the *National* has been building steadily for the past fourteen successful years is going to serve dealers better this year than ever before. This *National* confidence and prestige is a good banner to get under right now. Bear in mind, that the *National* has not been an "up and down" proposition, but a consistent winner. The *National* has no bad reputation to "live down." It has a clean, convincing record for quality cars of dependable performance. In fact, the season just closed has been the *National's* best. Do you suppose the buying public is ignorant of this? Don't you realize that with the *National* you are not handicapped, but rather, are put on the vantage ground?

¶ The New *National* "Aisle-way" is the last word in Style design. It accommodates six passengers, each in a comfortable, convenient seat. The extra seats are easily folded entirely out of the way and completely covered. A passage-way between the front seats allows all passengers to easily change seats, also makes each of the two seats veritable armchairs.

¶ The easiest thing we have to prove is that this new *National* is an excellent mechanical device. It is also without a superior in style, comfort and convenience.

Six Cylinder motor giving more than sixty horse power and better than fifteen miles per gallon. 132 inch wheelbase. Tires, 36x4½.

Cantilever springs—Electric Starter and Lights—Fully equipped. *National Sixes* made in four types, 2, 4, 5 or 6 passenger bodies.



Six Passenger with "Aisle-way" Front seats and disappearing armchairs.

National Motor Vehicle Co., Indianapolis, Ind.

Dealers, Which Light Weight Six Are You Going to Sell?

Men hardly ever talk about light sixes without speaking of the Chandler and its motor. It is seldom, indeed, that more than one or two other light sixes are MENTIONED alongside the Chandler.

CHANDLER \$1595

THE Chandler is distinctly among the leaders, and strengthening its position every day. Because it is so clearly superior, we believe it will be the **unquestioned** leader within the year.

The demand for the Chandler has increased so rapidly that we were unable to fill our orders in July. In big and little cities alike the Chandler demand is growing by leaps.

The car has sold itself. We will be on a 5,000-car-per-year basis within the next 30 days.

Of course we are going to take care of our present distributors and dealers, **but we will be able to take care of a few more.** Will you be one of them?

Many of the most experienced dealers in the country have tied to the Chandler, and they're glad of it. We would be glad to have you **ask them.** Let us send you their names.

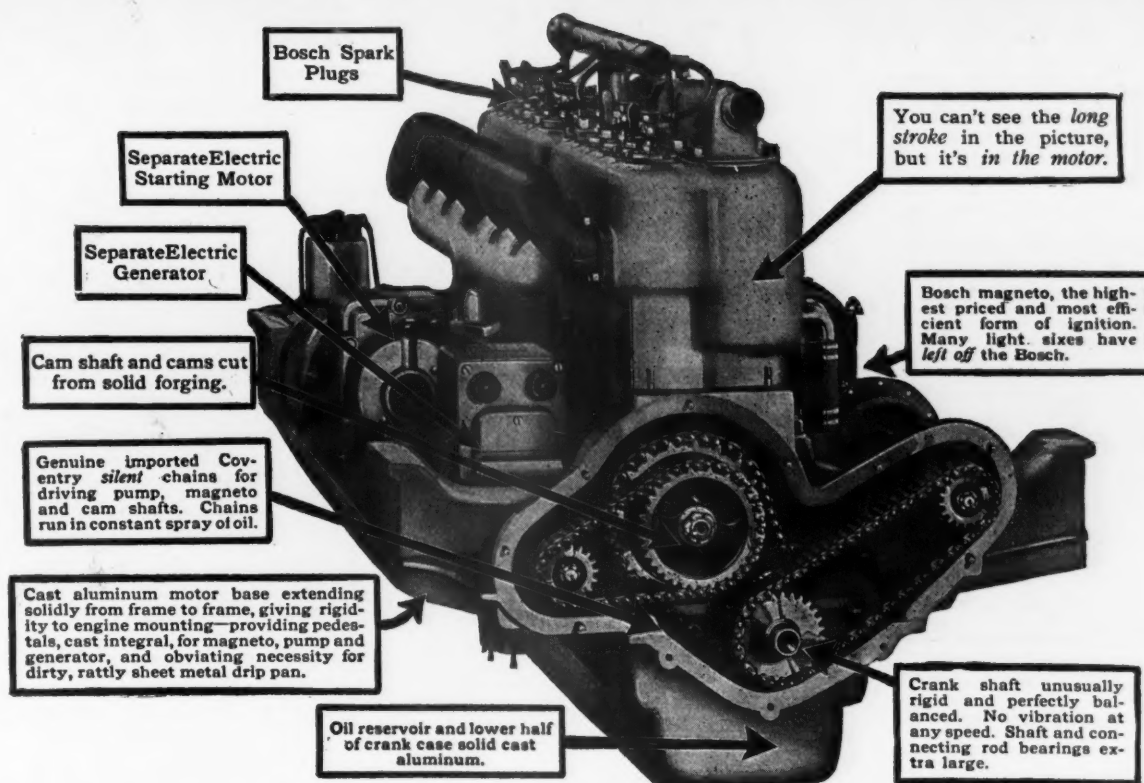
If you sell the Chandler, you sell a leader. Sales come fast and every sale brings **more** sales. It's a moneymaker for you, and a sound, prosperous, growing line. Ask Dunn's or Bradstreet. Ask your banker.

Wire or write us. Come to the
factory and see the car built

Chandler Motor Car Co., 208-283 E. 131st St. Cleveland, O.

New York City Office, 245 West 55th St., Cable Address, Chanmotor

Ask Our Dealers What They Think of the Chandler



Its Marvelous Motor Makes the Chandler a Really Great Automobile

THIS is the **exclusive** Chandler design and Chandler make of motor, not a common stock motor found in different makes of cars. It cannot be had in any other car than the Chandler Light Weight Six.

With six years of six-cylinder experience back of us we pioneered the way two years ago in the light six field. The Chandler proved that a high grade six could be built to sell for less than \$2000.

The success of the Chandler shows we have what a wise public wants.

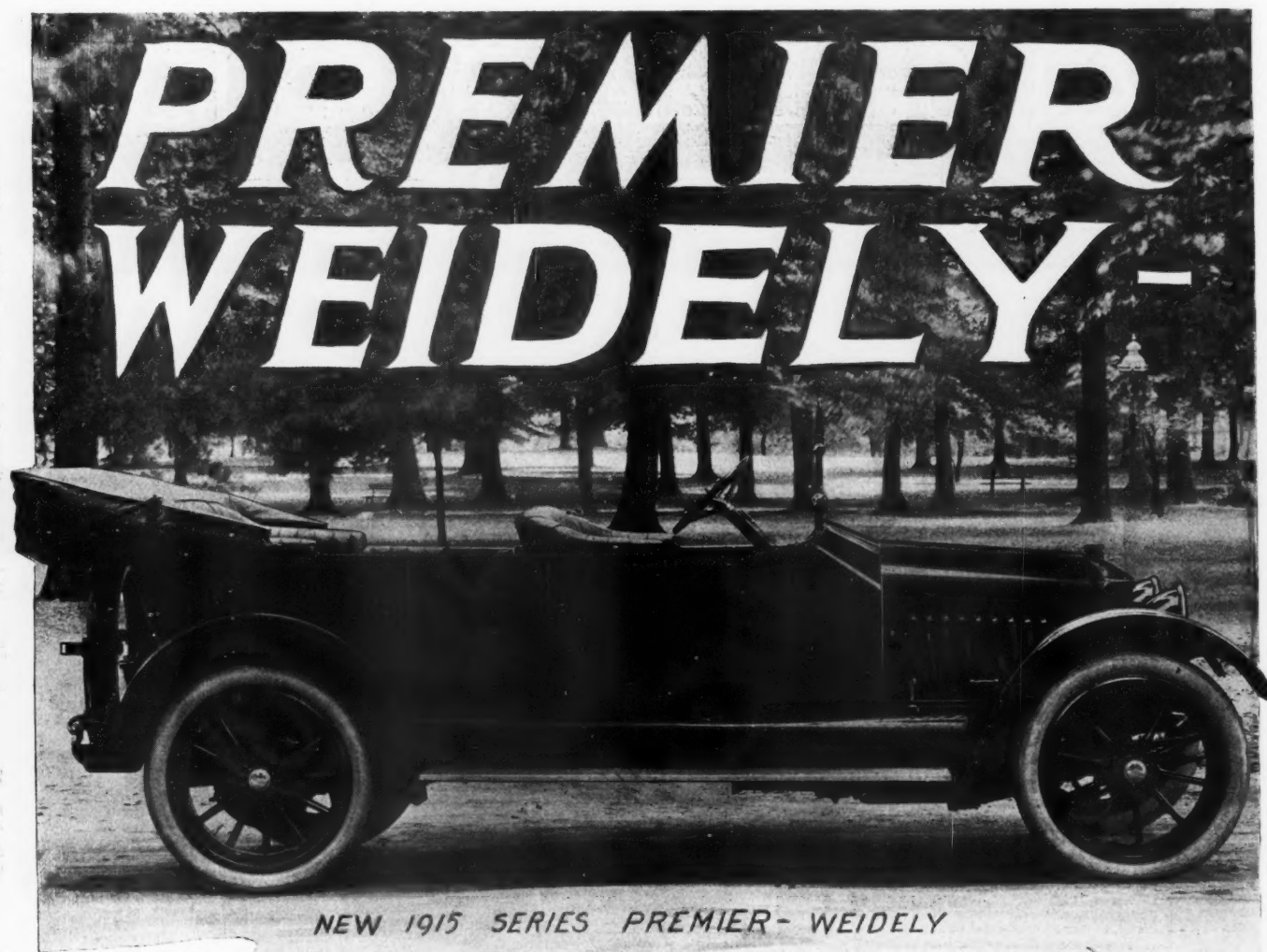
A whole host of light sixes followed the Chandler. And still they come. But what of their motors? How many are the builders' exclusive design? How many of them **compare** with the Chandler motor?

The profit-sharing price for the new 1915 Chandler models seems almost impossible, but it's true. Touring car or roadster \$1595. For Fall delivery handsome limousine, sedan, coupe and cabriolet.

The Chandler weighs only 2885 lbs., fully equipped. It runs 16 miles or more per gallon of gasoline, 700 miles per gallon of oil, and 7000 miles per set of tires. Speed, 3 to 55 miles per hour on high. Climbs every famous demonstrating hill in America on high.

Chandler Motor Car Co., 208-283 E. 131st St. Cleveland, O.

New York City Office, 245 West 55th St., Cable Address, Chanmotor



NEW 1915 SERIES PREMIER-WEIDELY

WORDS and illustrations cannot do the PREMIER-WEIDELY half-justice. You should see the car itself, sit behind the wheel, "step on the button" and get a new sense of power—dominating and masterful power that makes you realize an absolute supremacy on the highway. And with all of its power it is so flexible and easily controlled that you marvel at the genius responsible for its creation.

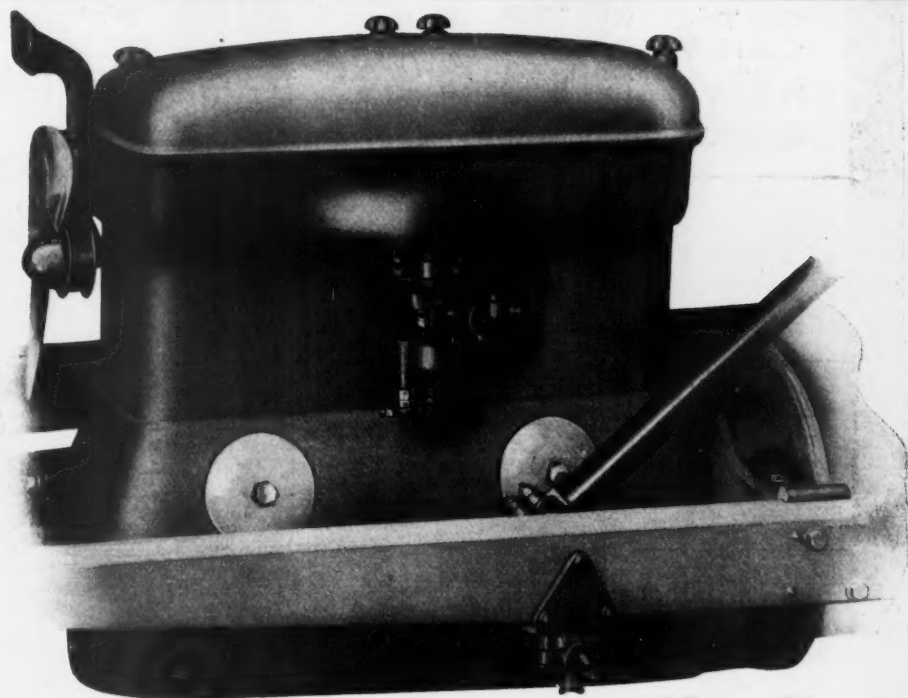
We urge you, Mr. Motorist, to arrange a demonstration. We want you to test its roadability, its mileage per gallon of gasoline and its remarkable tire economy. Get acquainted with its many other points of superiority which rightfully appeal to the expert motorist.

The PREMIER-WEIDELY is the most important development in the motoring world during the past ten years. It assures the permanent superiority of the poppet valve type of motor.

Catalog will be mailed upon request.

Premier Motor Manufacturing Co.
Indianapolis, Indiana

Six cylinders, $3\frac{5}{8} \times 5\frac{1}{2}$; block-cast; unit power plant; three point suspension; fly wheel enclosed; electric starter; electric lights; gear driven tire inflator; 132" wheel base; $36 \times 4\frac{1}{2}$ " tires; center control; left side drive; rear axle that is controlled by Premier



patents; especially effective brakes—526 inches of braking surface; dry plate multiple disc clutch; propeller shaft of special alloy steel, two universal joints insure free action in every shaft position; 22 gallon gasoline tank; vacuum feed; combination pressure and splash lubrication; gear driven centrifugal water circulating pump; one-man top; Warner speedometer—and other appointments highest quality throughout. Price \$2700, f. o. b. Indianapolis.

ON THE QUIET

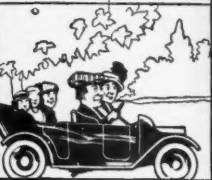
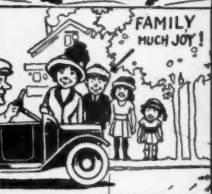
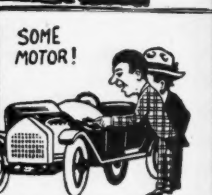
by HYATT

Mr Otto Owner
in his quest
for Silence

Complete in One Reel-



AUTOMOBILES



Naturally.
New Car runs
fine until —



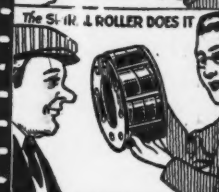
Enter the
Villain
Mr. Squeek



Arrested
for
Disturbing
The Peace



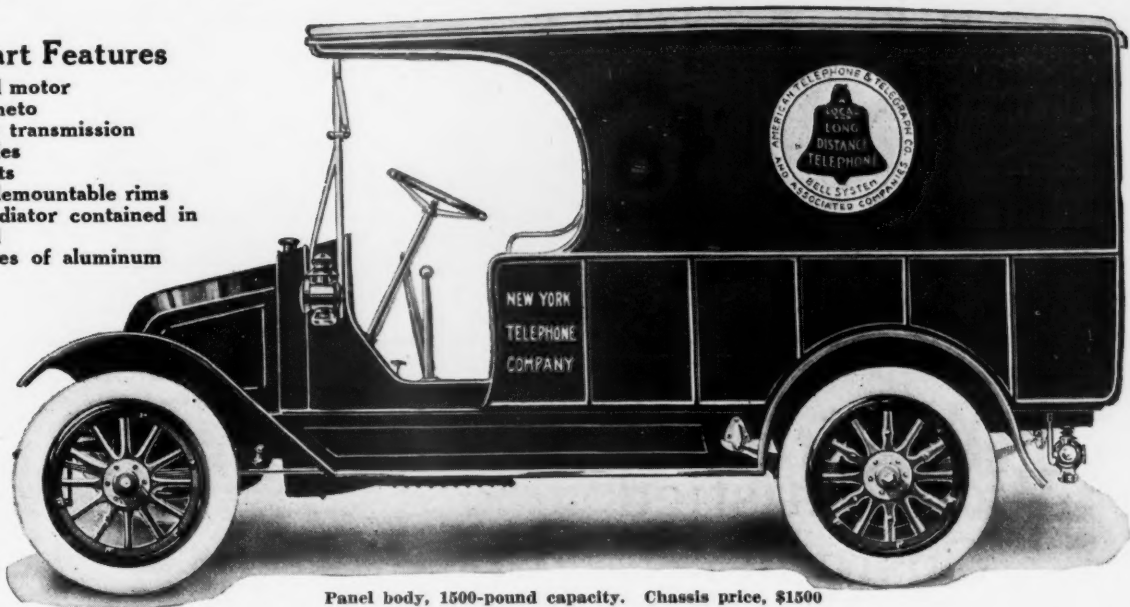
Rescued by
HYATT
The Hero



The New Stewart

Stewart Features

Continental motor
Bosch magneto
Brown-Lipe transmission
Timken axles
Spicer joints
Firestone demountable rims
Feddors radiator contained in the cowl
Panel bodies of aluminum



Panel body, 1500-pound capacity. Chassis price, \$1500

A Better Truck—A Bigger Opportunity for Dealers

Here is the new 1500 pound Stewart—the light delivery truck that is years ahead of any other on the market—with 500 less parts than any other truck of its type, more simple, more fool-proof, more economical of tires and gasoline consumption.

THE Stewart truck has always proved a money-maker for dealers. With its added features, this new Stewart will make more money for dealers than ever before.

For the new Stewart is built of absolutely the finest materials purchasable today. No truck at any price has better material and workmanship than the Stewart.

Why Stewarts Sell So Fast

Stewart trucks always—everywhere—make good, as they have made good for three years. We honestly do not know of a single dissatisfied owner.

We do not know of a single case where a Stewart truck has been discarded for any other type of truck.

50 per cent of our business comes from merchants who have used other makes of delivery trucks.

Our sale of repair parts for a year averaged only \$1.37 per truck.

Owners report 5,000 to 8,000 miles from a set of tires.

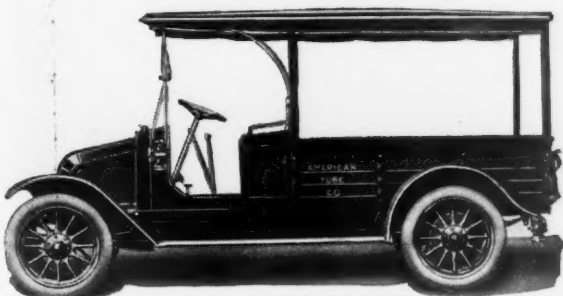
In 120 Cities and 80 Lines of Trade

These records indicate why Stewart trucks are today making money for dealers and merchants in over 120 cities in more than 80 lines of business in the United States, Canada and South America.

These performances account for the enviable repeat order record of Stewart trucks. For instance, the Bell Telephone Company, which purchased 9 Stewarts, now has a fleet of 19. The Buffalo Evening News has increased its fleet of Stewarts from 6 to 11. The Wagner Pastry Co., Newark, N. J., operate 8 Stewarts; the Peerless Laundry Co., Los Angeles, 5.

Other repeat orders have come from the Iten Biscuit Co., Omaha; Bonwit-Teller & Co., Fifth Avenue, New York; Gerhart-Lang Meat Co., Buffalo; Rice & Kelly, Pittsfield, Mass.; Kearns & Carroll Silk Co., Paterson, N. J. And so on and so forth.

Ask anybody about the Stewart. Write for complete information about the new Stewart. Write today. Find out about our opportunity to dealers. Ask for our book, "How Motor Delivery Pays."



Express Body with Top, 1,500 pounds capacity. Chassis Price, \$1,500.

A New Policy for Dealers

Our dealership proposition is an unusually liberal one. We do not require dealers to put up a lot of deposit money and contract for a big number of trucks. With our increased facilities, which means larger output, we so arrange our schedule as to have a certain number of trucks abroad at all times. Thus we can assure prompt deliveries.

Stewart trucks are supplied with any type of commercial body, also bodies for ambulances, police patrols, casket wagons, hotel busses, etc. Write today and find out how it will be to your advantage to handle the Stewart.

Stewart Motor Corporation, Buffalo, N.Y.

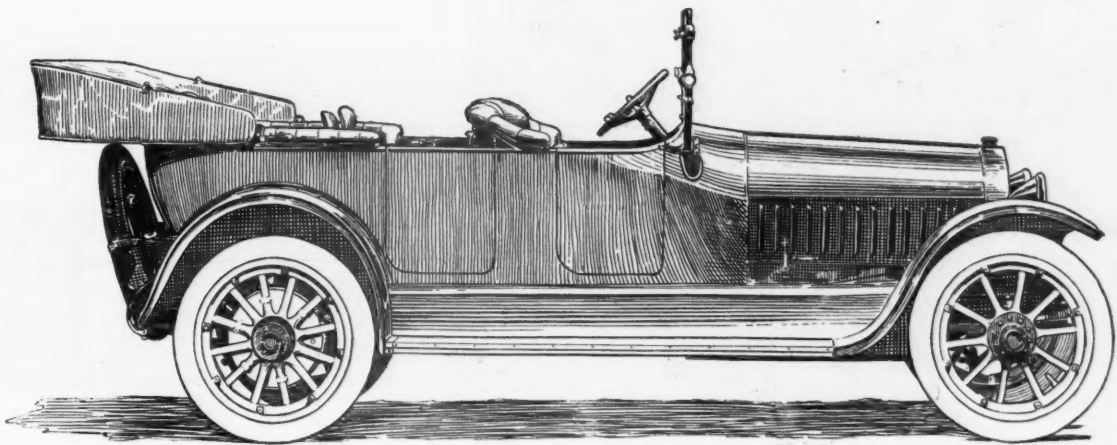
T. R. Lippard, Pres.

R. G. Stewart, V. P. & Ch. Eng.

R. P. Lentz, Sec. & Treas.

When Writing to Advertisers, Please Mention Motor Age.

"The Easiest Riding Car In The World"



The New Marmon "41" Medium Six, \$3250

There are many big, live, vital sales features that should lead the capable, intelligent car salesman to investigate the Marmon proposition.

Get the new Marmon "41" details—you'll find here the **only** "center fire" "L" head engine in any American car, the **only** continuous circulating oiling system which automatically feeds oil under pressure to the cam shaft and valve tappets as well as to every bearing surface, the **only** clutch which unites the simplicity of the cone with the smoothness of action of the multiple disc. The beautiful, tapering bodies leave nothing to be desired in the way of appearance. It is the **only** car with the new Bosch starting and lighting system designed, guaranteed down to the smallest wire by these world-famous makers, solely for the new Marmon "41." There are Silvertown Cord tires, one-man top and many other details of Marmon standard equipment that prove value to the salesman.

These Real Sales Points Should Appeal to You

This car **actually** offers just what the experienced car buyer wants.

It gives you an immediate opportunity to broaden and stabilize your business.

Take the time right now and investigate the new Marmon merchandising plan and what it means to you.

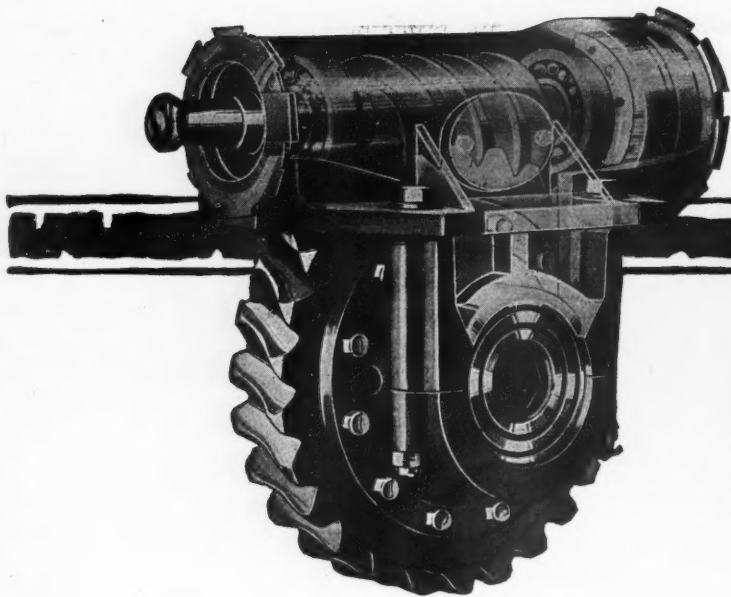
It was made to help your business and bring you satisfied customers and permanent profits.

Marmon "41" 132-inch Wheelbase, \$3250

Marmon "48" 145-inch Wheelbase, \$5000

Nordyke & Marmon Company
Indianapolis, (Established 1851) Indiana

"Over Sixty Years of Successful Manufacturing"



SHEL

IT isn't alone the question of superior design that has established Sheldon Worm Gear Axles as the most efficient axles of this type obtainable, for manufacturing methods and selection of materials are on the same high plane as the efforts of the engineering department.

WORM GEAR AXLES

As we have said time and again in the past, primarily, the Sheldon Worm Gear Axle was designed irrespective of cost or other conditions for the sole purpose of producing the most efficient axle it was possible to produce. Sheldon Axles are designed and built with the sole idea of giving service and not for the purpose of selling bearings.

While it is true, that probably the most important detail in Sheldon axle construction that makes for the superior efficiency of these axles, is the fact that the thrust load of the worm itself is carried by double thrust ball bearings, there are still a great many other points of superiority that enter into the general all around efficiency of the axle itself—and in this particular piece of copy we are itemizing briefly some of the characteristic features of Sheldon Worm Gear Axles.

Special Features

The imported worm and worm wheel are made of a special heat treated worm steel and ground by special machinery. The worm wheel face is of special formula bronze.

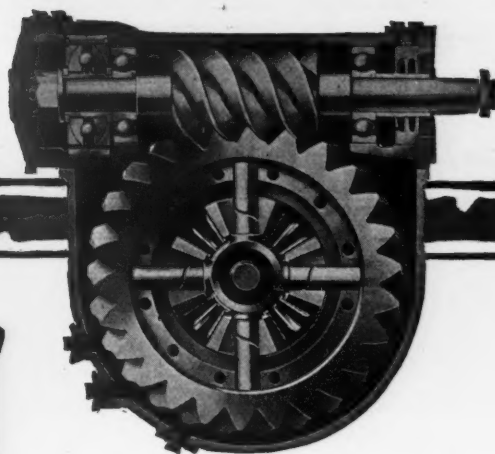
The worm carrier is a very substantial casting machined by special jigs and fixtures to receive the worm and worm wheel in perfect alignment. The methods employed in the machining of the worm carrier insure positive adjustment at all times and render the assembled unit absolutely fool-proof. By following the particular methods in practice in the Sheldon shops and by using ball bearings in the assembly we are able to furnish the truck buyer with a worm gear job in which there is absolutely nothing to get out of adjustment, a job which, therefore, cannot be adjusted.

All differential gears and pinions are 3½% nickel steel, heat treated. The differential spider is drop forged in 3½% nickel steel heat treated and ground to size. The differential is mounted on double row an-

SHELDON AXLE CO.,

Makers of Springs and Axles for Heavy Duty Service for more than 50 years

DON



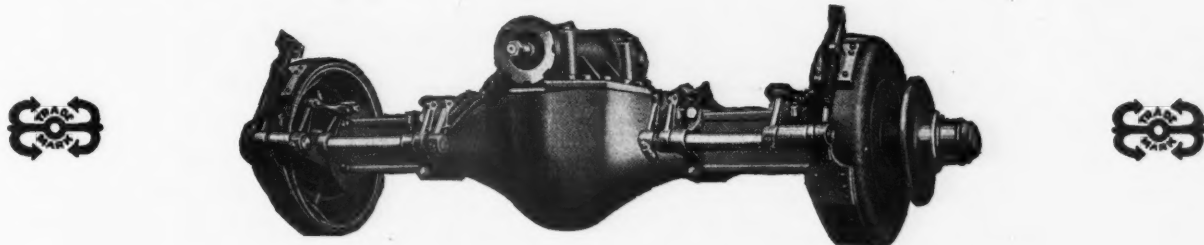
nular bearings. The brakes are of the internal self-intensifying and external wrap up type.

The axle shafts are $3\frac{1}{2}\%$ nickel steel heat treated and accurately proportioned aiming at a uniform stress throughout.

The axle housing is a one piece casting essential in commercial vehicle work for it presents the minimum number of joints to be affected by extreme road shocks due to operating on solid tires.

date the extreme thrust load prevents wedging, undue wear and consequent necessity of adjustment present in other types of bearings, and you have briefly the underlying cause for the plain statement—

That the Sheldon Worm Gear Axle will deliver to the road wheels a greater percentage of power applied than any other axle on the market.



Special attention is called to the lubrication of the worm itself. There are three oil plugs. The lower plug we designate as the drain plug and is to be used for drawing off the old oil and cleaning out any sediment that may have deposited in the bottom of the housing. The intermediate plug is what we call the dangerous oil level and is placed at a level below which the oil must never be allowed to drop. The top plug is the safety oil level. The axle in all cases should be filled to this point before using.

There is no gainsaying the fact that ball bearings are the greatest reducers of friction of any type of bearing. Combine the truth of this statement with the further fact that the use of ball bearings to accommo-

date should be borne in mind that the general conditions both of design and construction which typify Sheldon Worm Gear Axles as the superior of all axles from a standpoint of efficiency are just ordinary routine conditions throughout the entire Sheldon plant.

Sheldon front axles, Sheldon springs, Sheldon brake and radius rod equipments are all produced under the same ideal engineering and manufacturing conditions as are Sheldon Worm Gear Axles. First has been the question of efficiency, the greatest service to the consumer in each and every Sheldon product. Cost, type and methods have all been subservient to this primary idea.

Wilkesbarre, Penna.

CHICAGO: 122 S. Michigan Blvd. SAN FRANCISCO: 444 Market St. DETROIT: 1215 Woodward Ave.

Studebaker

PROGRESSIVE motor car dealers in the smaller towns and villages are as eager to secure Studebaker territory as are the distributors in larger cities.

They know as do the larger distributors that Studebaker cars are money makers for Studebaker dealers.

They know that a Studebaker franchise is almost an assurance of permanent success.

They know that Studebaker service and dealer co-operation reach clear down to the smallest and most out-of-the-way dealer on the list. They know that Studebaker advertising is so planned as to afford the greatest possible help to every Studebaker dealer.

And it is because of this widespread knowledge of the value of a Studebaker connection, that Studebaker territory is always at a premium.

In order to render still more efficient the Studebaker sales organization we are dividing and sub-dividing some of the larger territories. This is going to leave openings for a few more dealers of the Studebaker type.

Information regarding these openings may be secured through the sales manager.

Prices F. O. B. Detroit

Four Roadster... \$ 985

Four Touring Car 985

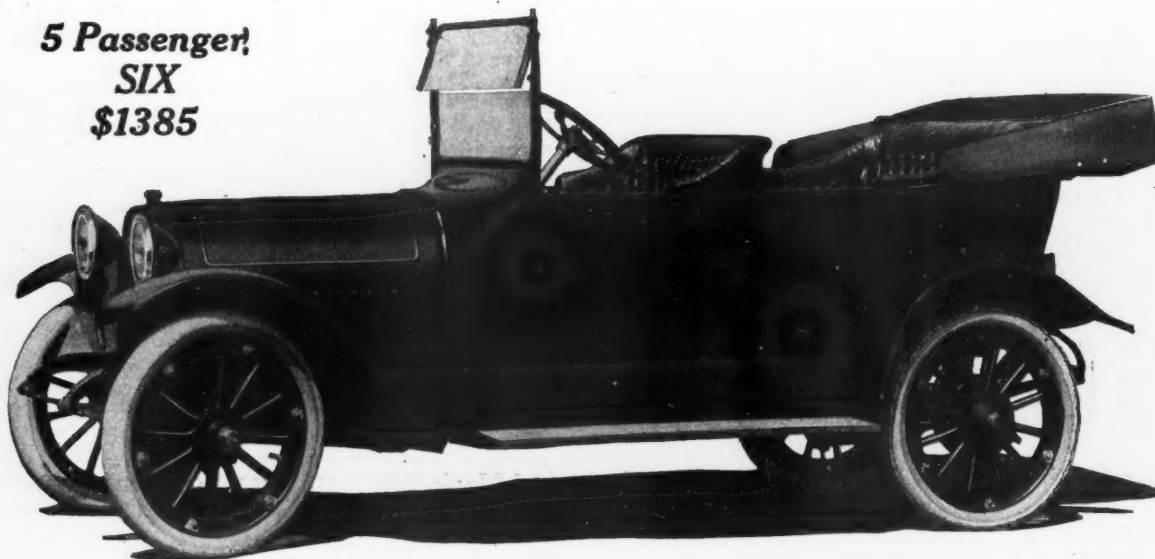
5 Passenger Six.. 1385

7 Passenger Six.. 1450

We extend a cordial invitation to all dealers when in Detroit to inspect Studebaker plants.

STUDEBAKER, Detroit

**5 Passenger,
SIX
\$1385**



Stop Punctures

with Inner Tube Armor

1. Absolute protection against all punctures
2. Absolute protection against all blow-outs
3. An increase of one-third more tire mileage

INNER TUBE ARMOR is a liner of strong Sea Island Cotton Fabric and India Gum Rubber, in which has been vulcanized, by our secret process, three layers of alloy discs—28 gauge metal.

The ARMOR fits between the inner tube and casing. The perfect vulcanizing prevents any slipping of the metal discs and therefore any cutting of the tire. **WE GUARANTEE THIS.**

We've never been able to quite figure out the life of one of our ARMORS, but we know this—we have any number *in their eighth casing and still running*. Some are on heavy trucks and others on light deliveries and pleasure cars.

The Boston Store at Grand Rapids has had 70,000 miles out of one set of ARMORS and still going. Mr. E. J. Corbett, of Detroit, had an additional 4,000 miles after an ARMOR had been put in a casing that had already run 7,000 miles.

**Stop the terrific Tire Expense
Inner Tube Armor will do it**

Write for catalogue

DEALERS

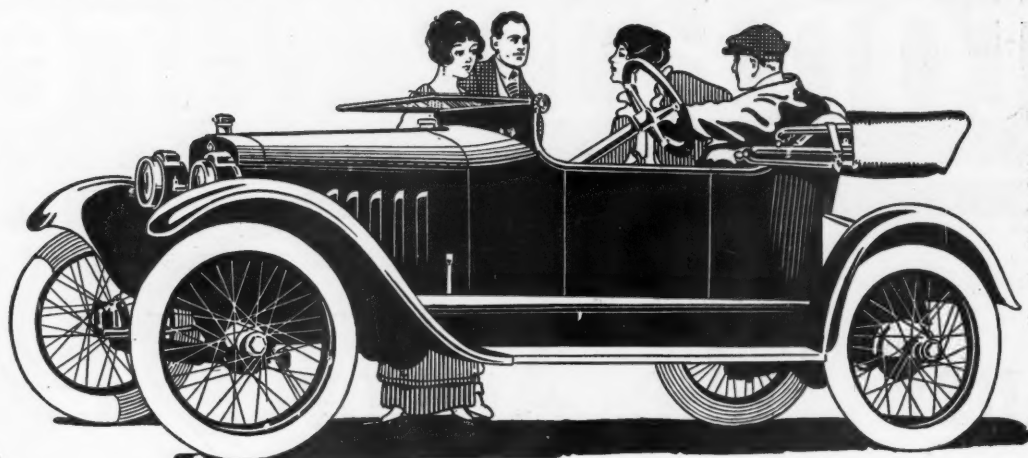
We have a worth-while proposition—write us. We even allow you the cost of installation.

INNER TUBE ARMOR CO., Detroit, Mich.

Note the 'EXPOSED DISCS' on ARMOR—even the contact with the pavement does not loosen the discs.



The New SAXON \$395



A New Car—New Dealer Discounts

It Will Pay You to Learn About Both

The new Saxon with running boards and 38 other detail improvements has caused a *new wave of Saxon enthusiasm* throughout the country. This condition and our new selling proposition create a real dealer's opportunity.

Some Things for Dealers to Think About

The Saxon car and the Saxon Company are successful. Both are established. We are in business to stay. We have demonstrated that we can do what many "wiseacres" of the automobile business said we could not do—namely, market the Saxon car at \$395 at a profit.

Within four months after we began making shipments we had shipped 5,000 cars; **this is more cars than any company ever shipped in the same length of time after starting in the automobile business.**

We have not only shipped a great many cars, but we have constantly improved them. Our most experienced dealers tell us that no car has ever been so rapidly and thoroughly improved and refined and made so continually more appealing to the public as the Saxon car.

Saxon Has Found Its Market

Today we have more orders than ever before. We are receiving more and more orders in every mail. The reason for this is that the Saxon car has found its market. We have demonstrated that there is a distinct field for a thoroughly good, good-looking two-passenger car that can be economically operated.

The Saxon car today is the best two-passenger automobile in the whole world, everything considered. It is the best buy at the price because on the average it is most suitable for the man who wants a two-passenger machine.

It has more room than any other; it is more comfortable to ride in; it is better looking; it is built of better materials; it is more up-to-date in design; it has plenty of power for all emergencies and all road conditions; and it can be kept running for less cost per mile than any other car.

The success of the Saxon car at \$395, the great public interest in it, the enthusiasm of Saxon dealers and Saxon owners has done more than any other one thing to make a number of companies in the low priced field cut their prices.

Price Right From the Start

The price of the Saxon car does not need to be cut in order for it to sell in large quantities.

We put the full value into the Saxon car in the beginning.

From the first we have accepted a very small profit per car. We are still accepting it, because we are here to do business on a larger and larger scale, and that is possible only when the buyer is getting big value for his money.

We give every buyer of a Saxon car more than he can get in any other car in the world at the same price. We have an exceptional proposition for dealers. It will pay you to investigate this money-making opportunity.

Write Us Regarding Open Territory

Saxon Motor Company, Detroit, Dept. M

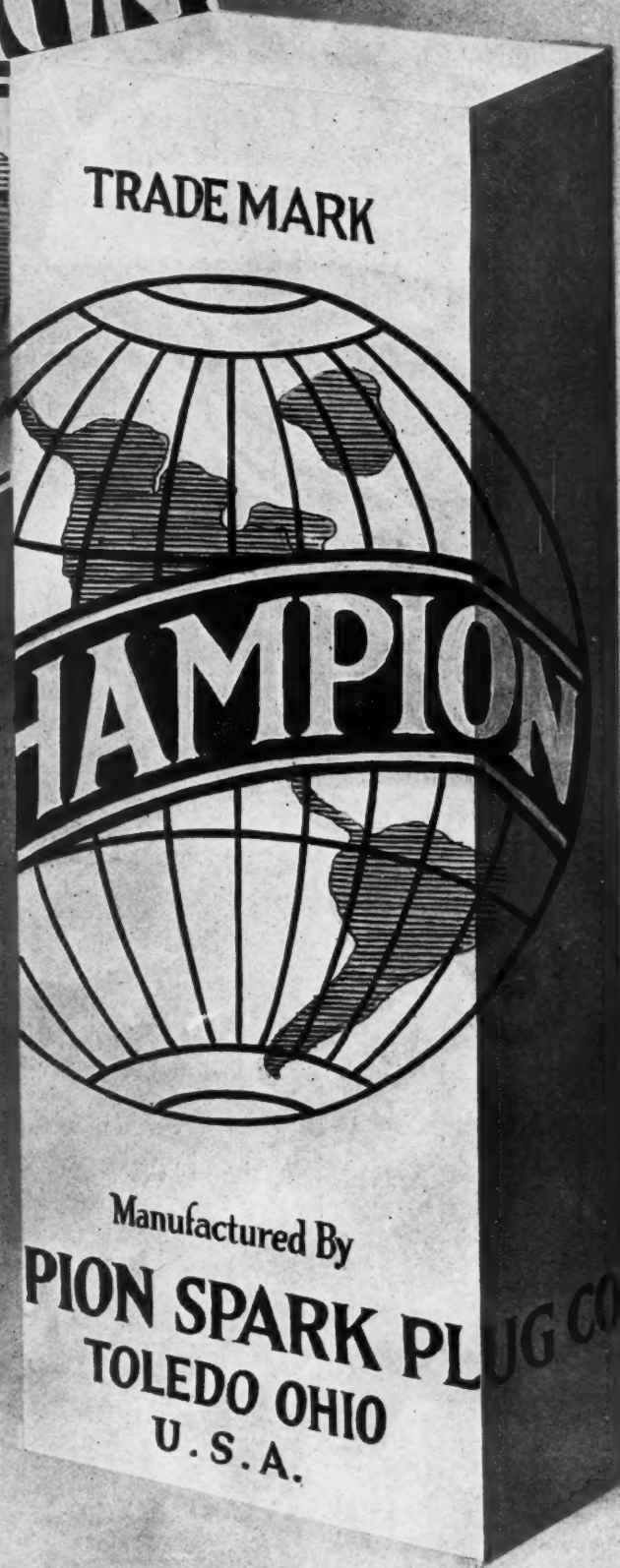
When Writing to Advertisers, Please Mention Motor Age.



*This is the
Package
and the World
Trade Mark
to look for*

In the show windows and on the shelves of 35,000 dealers throughout the United States you will find this well known package. It contains the famous CHAMPION SPARK PLUG which is recognized everywhere in motordom as the greatest and most efficient spark plug manufactured.

More than 75 per cent. of all the motor cars made this year are being equipped at the factory with CHAMPION SPARK PLUGS.





- ✓ 1 INSPECTION—Gauging shells for thread diameter
- ✓ 2 INSPECTION—Checking shells for gasket seats
- ✓ 3 INSPECTION—Gauging threads of bushings
- ✓ 4 INSPECTION—Checking gasket seats of bushings
- ✓ 5 INSPECTION—Passing bare porcelains through limit gauges
- ✓ 6 INSPECTION—Testing strength of electric welds of center wires
- ✓ 7 INSPECTION—Testing the assembled porcelains
- ✓ 8 INSPECTION—Copper and asbestos packing washers
- ✓ 9 INSPECTION—Compression tightness of assembled plugs
- ✓ 10 INSPECTION—Rejection of all plugs with crooked porcelains
- ✓ 11 INSPECTION—Point setting
- ✓ 12 INSPECTION—Finish and workmanship
- ✓ 13 INSPECTION—General—of the plugs by chief inspector
- ✓ 14 INSPECTION—Final—of finished packages before shipping

No Imperfect Parts Get Into Champion Spark Plugs

In the production of CHAMPION SPARK PLUGS the division of labor is carried to a point of the very highest efficiency. Every workman has but a single operation to perform, a single operation in which he is highly skilled. Rigid inspection of each of these operations maintains the very highest standard of workmanship. The most accurate gauges are supplied for every part so the inspectors may detect the slightest defect.

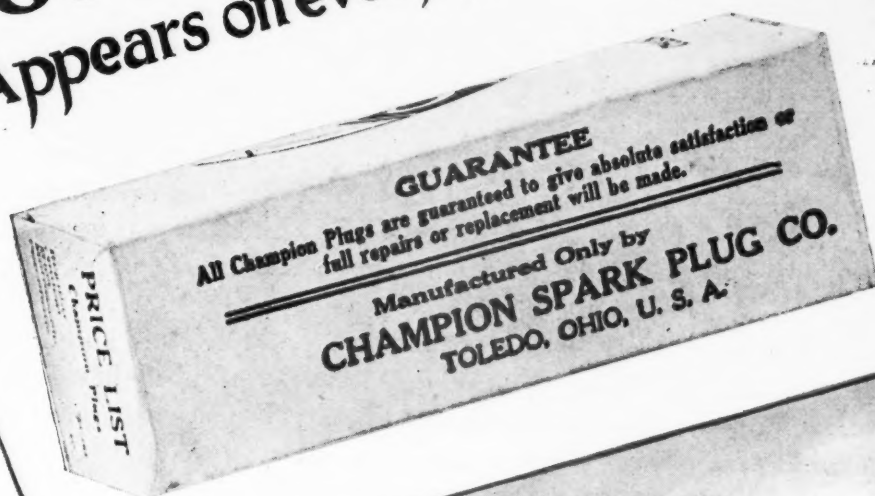
Fourteen separate and distinct inspections must be passed before a single spark plug goes out of our hands. Surely when every part is thus carefully gone over, and after each assembly operation is rechecked—the finished plug leaving our factory, carrying with it to the motor public our manufacturing reputation, must be in every detail a perfect spark plug. The finest automatic machinery procurable, a large daylight factory of the most modern design, a manufacturing organization of exclusive spark plug experience and a system of distribution unsurpassed by any accessory concern in the automobile industry give to the buyers of CHAMPION SPARK PLUGS the assurance that they are getting "the one best buy" in the whole field of spark plugs.

Our
Parts Inspection
Department





**THIS
GUARANTEE**
Appears on every package



OUR USE OF NOTHING BUT THE BEST MATERIALS MADE, THE PERFECTION OF OUR MANUFACTURING PROCESS AND THE COMPLETENESS OF OUR INSPECTION, INSURE US IN THIS OUR BROADEST OF ALL KNOWN GUARANTEES.

Our guarantee is simply this—if you are dissatisfied with the plug for any reason whatever, we will replace it. It must give complete satisfaction **to you.**

We rely upon the reasonableness of human nature. We know the plugs are as perfectly made as human hand and brain can make them. This knowledge enables us to offer to replace wherever there is any doubt.

We have backed up this same guarantee for several years and we know what we are talking about. It takes a lot of confidence to put that kind of guarantee behind any product.

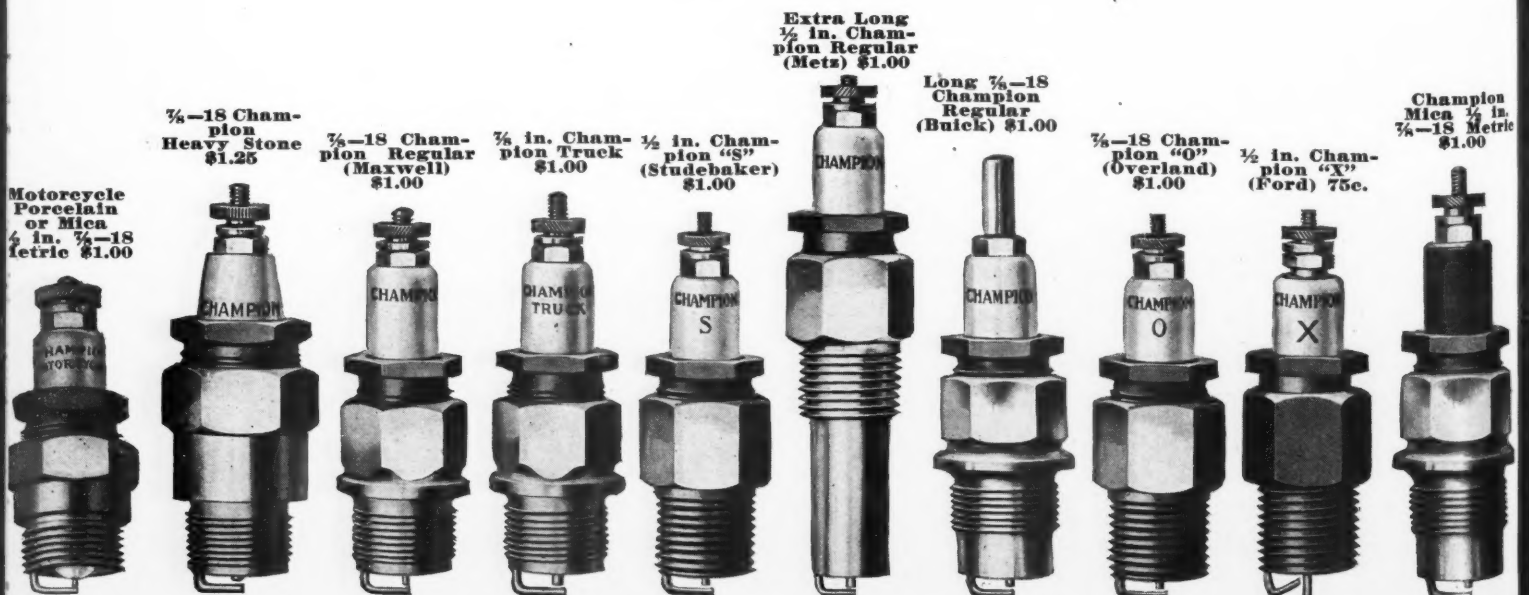


WE INSURE DEALERS WHO MARKET OUR PRODUCT

There is no chance of you, Mr. Dealer, going wrong in carrying a complete line of our Champion Plugs. We can furnish you with **any type** plug, taking care of your spark plug business in every detail. Our offer is such that you will find it well worth while to have no other plugs in stock but Champion plugs. Those who handle our product are insured against loss in this manner. We willingly replace one type for another. If you have any particular type plug in stock that is not moving, all you have to do is notify us. It is our aim to furnish our customers with type plugs which are being used to greatest advantage. No benefit is derived by us in goods remaining long in stock. We want them on the car. Why fill your shelves with an assortment of freakish designed plugs when you may have our standard makes which are always worth to you, in money, just what you have paid for them. There are no arguments in facts.

Our offer, which is most liberal, in addition to our many ways of helping, makes the handling of our goods an absolutely safe proposition. Under these conditions you can afford to carry the most complete line. In doing so there is no possibility of loss, and you are always in a position to furnish your customer with just what he requires, and that satisfaction of his is far reaching and does not stop at that one purchase.

We look after our goods while they are being used with the same care which is given in the manufacture. After your customer buys, we take care of him. Our guarantee looks after your customer in every particular. We strive for endless satisfaction.

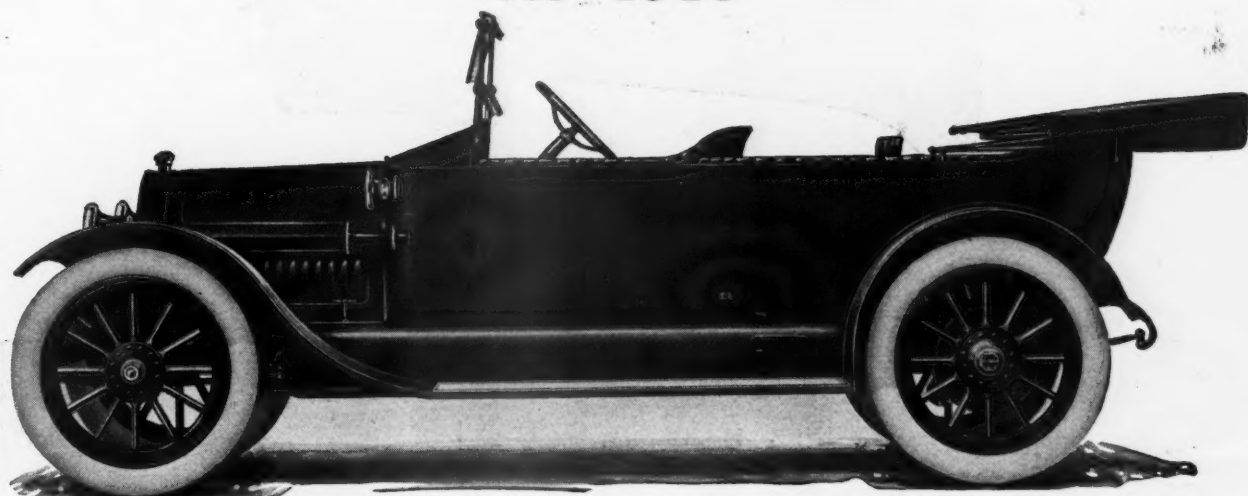




Lyons-Knight



for 1915



\$2980 1915 MODEL K-4
FOR 7 PASSENGERS

1915 MODEL K-4 **\$2900**
FOR 5 PASSENGERS

The most important news in Motor Age

Here is most important news for every wise motor car dealer or buyer.

The new Lyons-Knight for 1915 is ready for delivery.

The great institution behind this car—its many advanced features of design and construction—the wonderful records of these cars during the past year—all make this announcement of vital interest to both dealers and buyers.

Note These New Details

Notice the new taper line bodies—greater clearance under the rear axle—every detail of this car's appearance indicates its class—the peer of the \$5,000 car.

Conveniences—see the unfailing and improved starting and lighting system, and the many other luxuries and refinements of added convenience. The one-man top is supplied with Jiffy curtains. A power tire pump adds even further convenience. The dealer or the buyer cannot afford to overlook these points which are so essential to genuine motoring pleasure.

Under the hood—you don't have to be an engineer or a mechanic to see the wonderful design and construction of the 1915 Lyons-Knight engine. The first glance, after the hood is raised, will convince anyone that the Lyons-Knight is no ordinary engine. Its silent, smooth,

powerful operation is guaranteed to give greater efficiency than any four or six cylinder poppet-valve engine of equal size. It also grows better and more economical with usage.

Riding Qualities—If it has been your privilege to ride in a Lyons-Knight, you have already been convinced that the delightful freedom from noise and vibration—the wonderful, quiet, smooth riding quality—brings a new meaning to motoring pleasure. This feature is the direct result of the Lyons-Knight engine combined with the silent, efficient worm drive.

Not only Lyons-Knight owners, but men who have owned and driven all kinds of American and European cars, voluntarily and emphatically proclaim that the quietness and the smooth-running qualities of the Lyons-Knight—over all kinds of roads—at all speeds—and under all conditions—are *unequaled*, regardless of make or price.

Today—NOW!

The best months of the year remain before you. There's no use to wait—you will never find a better car to sell or to own than this. Get in touch with us now. Put the car to any test you choose. Take your own way to convince yourself of its value, but—

SEE THE 1915 LYONS-KNIGHT

Is This YOUR Opportunity?

The Lyons-Knight is already represented in most important cities from coast to coast. If there is no dealer in your town, ask us **AT ONCE** for our agency proposition. It is without exception the most liberal and the most profitable proposition ever offered by a reputable, established manufacturer. *It will pay YOU to act QUICKLY.*

LYONS ATLAS COMPANY
INDIANAPOLIS INDIANA



\$9.50 to \$15.00

SPARTON

ELECTRIC MOTOR DRIVEN AND HAND OPERATED SIGNAL

The motorist cannot afford to depend on a good enough warning signal. When the time comes for action, he must have a horn that will compel quick, unthinking, instantaneous jumping—such is the discordant, action-compelling growl of the SPARTON when the button is pushed home. On country stretches a good pressure on the button produces a warning clarion that can be heard a mile down the road, giving everyone time to get out of the way. On city streets a light touch produces an inoffensive, but authoritative command, warning people at close range.

**Hand
Operated**

\$7.00

and

\$8.00



**Hand
Operated**

\$7.00

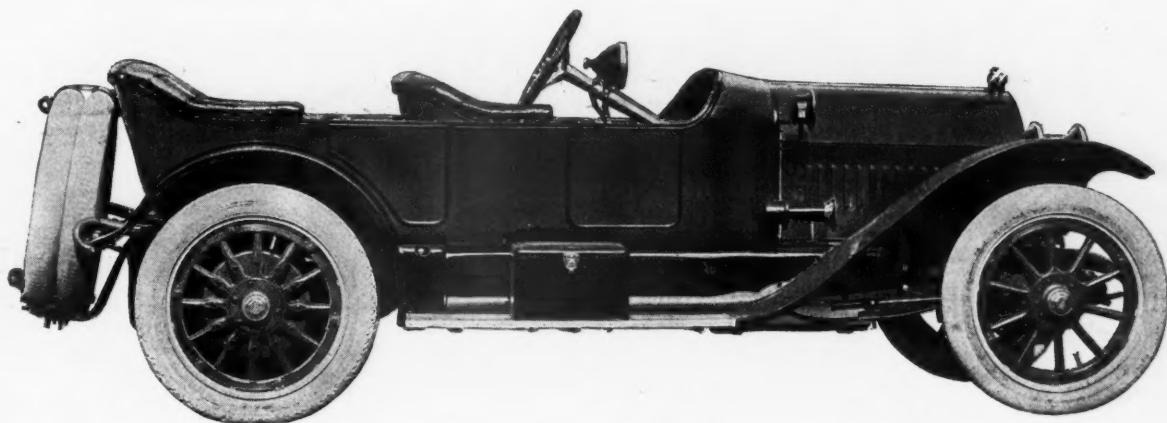
and

\$8.00

The Sparks-Withington Co., Jackson, Mich.

THE STUTZ BULLDOG

A NEW four-passenger speedster designed to meet the large demand for a smart, classy car of the touring type and yet to embody all of the qualities desired by the discriminating sportsman in the way of style, speed, and stamina.



Stutz four cylinder Bulldog \$2250

SPEED AND CLASS

You will find in the Sturdy Stutz all the speed, power and stamina you want for a friendly "brush" outside the city limits. This is the way one of our owners aptly expressed it: "When you drive a Stutz you own the road."

In every-day use, as in speed contests, the Stutz is the car of consistent performance. The reason is in the well-built chassis—made from specially selected materials—free from any minor defects which might mar your pleasure of driving after a few months of use.

The Stutz represents an honest value and a satisfying service after buying. It will pay you to investigate the Stutz car and the Stutz service. If convenient, take a trial spin in a Stutz—then judge for yourself.

Our Bearcat, our Torpedo Roadster, our Bulldog and our large six-passenger touring car form a choice of models that cannot fail to appeal to you. Speed, class, beauty of lines, and luxurious appointments—we have them all—we want only a chance to show to you the Sturdy Stutz.

*We make two, four and six passenger cars
four and six cylinder models*

WRITE FOR CATALOGUE A-2

STUTZ MOTOR CAR COMPANY OF INDIANAPOLIS

The **BOSCH LIGHTING** System

**has distinctive and exclusive
features and all the earmarks
of Bosch Quality—of Course**

THE BOSCH LIGHTING System provides, in simple form, an ideal method for lighting the highways and byways, as well as the car's interior.

THE VOLTAGE CONTROL is practically ideal, holding the current constant at all speeds, whether the road is rough or smooth. In consequence, the "Bosch Light" is even at all times and is free from flickering, flares or sudden periods of dimness. It projects far on the road ahead and well to the sides of the roadway. It is mellow in color and free from that uncomfortable, white, intense and blinding glare.

THE BATTERY is automatically charged but never subjected to undue current charges which would tend to strain the unit and thereby make it worthless. With the Bosch Lighting System the usual battery troubles, due to overcharging, are entirely eliminated.

HEAD LAMPS, side lamps, tail and dash lamps, special cable, switches and control box are all of Bosch manufacture. All are included in the complete Bosch Lighting System. There is nothing lacking, not even the quality that adds so much to general satisfaction and service.

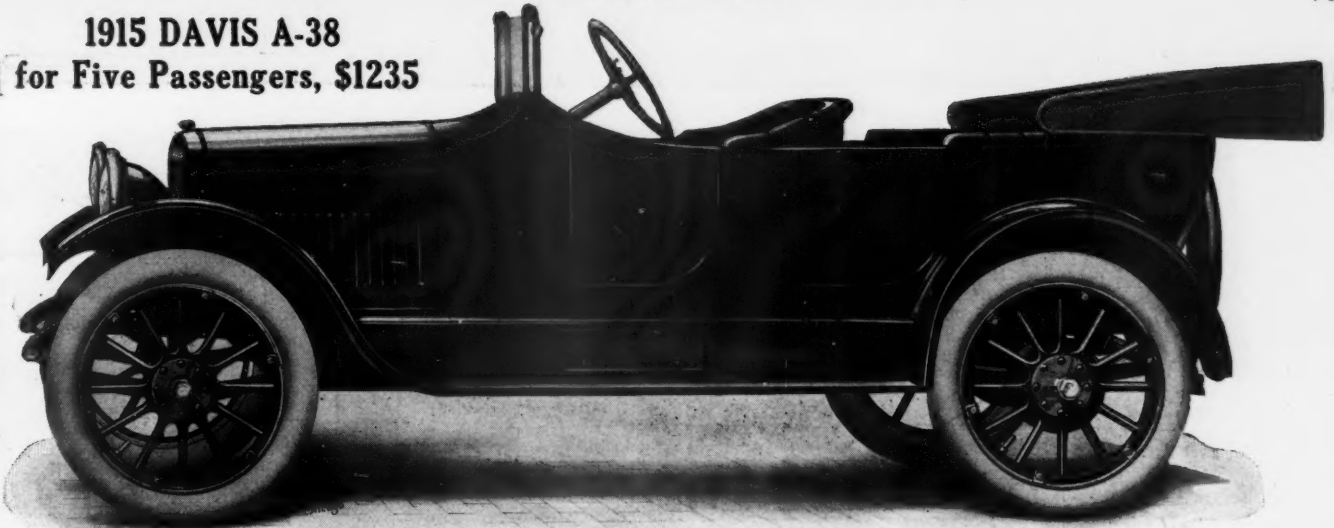
ANY CAR can be made "Electrically Bosch" throughout by having it Bosch Lighted, Bosch Started, and its combustion charges Bosch Ignited. The "Bosch Light," the Bosch Starter and the Bosch Ignition Systems are so varied in design and size that no car ever need be sold or bought without being Bosch-Equipt.

Be satisfied. Have your car "Electrically Bosch" throughout.

Bosch Magneto Co., 214 West 46th St., New York

CHICAGO : : DETROIT : : SAN FRANCISCO : : TORONTO

1915 DAVIS A-38
for Five Passengers, \$1235



1915 DAVIS

The Car That Engineers Call "The Fuel Miser"

So economical in operation is the new DAVIS A-38 that our engineers have taken to calling it "THE FUEL MISER."

Twenty-two to 25 miles to the gallon of gasoline is its average fuel consumption—an achievement we challenge other cars in its price class to equal.

Because of our extreme powerful Continental motor and light weight combined with a construction as sturdy as that of a locomotive, this new DAVIS model slides over hills and cuts through sand, going with power to spare.

Note the handsome streamline body—the peer of bodies carried by the highest priced European cars. Study the specifications—compare them with other cars. Consider the reputation and stability of the company back of the car. Then write us!

We'll send you further convincing reasons why your 1915 car should be a DAVIS.

DAVIS A-38, 5-pass. Touring Car \$1235
DAVIS B-38, 2-pass. Roadster \$1235

DEALERS: If you don't handle the DAVIS Line in 1915 you will have to **compete** with it. DAVIS Cars will be more popular than ever. Much of our output is already contracted for. We can handle a few more dealers **now**. Write or wire us. Look for our announcement of the New DAVIS 6-50—"The Six that has made good."

Geo. W. Davis Motor Car Co.
Richmond, Indiana

Specifications

Motor—Continental, four-cylinder, 3 $\frac{3}{4}$ x5" en bloc, 3-point suspension, unit power plant.
Lubrication—Plunger pump, constant level.
Cooling—Thermo-Syphon. Vertical tube radiator.
Carburetor—Stromberg, improved dash adjustment.
Ignition—Westinghouse ignition and lighting generator in one unit.
Transmission—Warner Selective, three speeds. Chrome vanadium steel gears. New Departure Ball and Hyatt Roller Bearings.
Axles—Weston Mott axle equipment.
Front Axle—I-beam drop forged, ball bearings.
Rear Axle—Three-quarter floating, extra heavy bevel differential gears, easily adjustable. Hyatt roller bearings throughout. Weight carried entirely on tubing. 12-inch external and internal brakes.
Control—Center of body. Left-hand drive. 18-inch corrugated steering wheel.
Frame—Pressed steel, 4-inch channel. Arched over the rear axle.

Specifications

Wheelbase—112 inches.
Springs—Half elliptic front, three-quarter platform. Rear, two inches wide, finest Sheldon quality.
Tire—34x4". Firestone demountable rims.
Self-Starter—Westinghouse electric motor, Willard storage battery.
Lamps—Bullet shape. Extra large, black enamel and nickel. No side lights.
Body—Stream line, large doors. Upholstery, dull finish No. 1 leather, over best curled hair and oil tempered springs. Deep-tilted Turkish cushion.
Top—Silk Mohair, with Collins "Always Ready" curtains.
Windshield—Double ventilating.
Equipment—Stewart flush type speedometer, electric horn, foot rail, robe rail, complete kit of tools, pump and jack, trouble lamp. All mountings best nickel-plating.

Mosler Vesuvius Plugs



Have no equals for speed and power.

Made to fit any engine, any thread.

Stone Insulation is practically unbreakable.

Unique method of assembly renders Vesuvius Plugs absolutely gas tight and insures perfect adjustment of sparking points.

A. R. MOSLER & CO
NEW YORK N.Y.

POWERFUL INDESTRUCTIBLE AND SURE

Powerful because of faultless design.

Indestructible because of the finest materials.

Sure because of methods and workmanship employed in manufacture.

EXCLUSIVE FEATURE

Note ears on collar.

The only plug that has means for assembly without rotating the insulator.

Washer and ears take up all friction of the nut and give the direct straight pressure which makes the plug absolutely gas tight.



Collar takes up friction of nut.

Collar cannot turn when nut is tightened because ears on collar fit into slots in shell.



A Special Invitation

to Every Manufacturer, Sales
Manager, Advertising Man, Trade Paper
Editor and Publisher in the Country

REGARDLESS of what your interest in trade journals may be, you are, in one way or another, a partner in the development of business building and business expansion through the medium of the Business Press. Any advance in trade journalism is of more than pocket-book interest to you. That your individual influence may be recorded—that you may add the light of your experience to that of the notable technical, class and trade journal editors and publishers in the country—you should cross three red-letter days on your desk pad and attend the

**9th Annual Convention of The
Federation of Trade Press Associations at the
Congress Hotel, Chicago, Sept. 24, 25, 26**

Bring with you anything you have to offer in the way of suggestions bearing on editorial circulation, or advertising policies. Or, if you do nothing more, come and listen to those who are making the trade press movement so tremendous a factor in modern business efficiency. One new idea gleaned from this fraternity, banded together for *your* interests, will make your presence at this convention pay you dividends.

Business Building Through the Business Press

For Further Information Address

E. R. SHAW, Chairman Committee on Arrangements
537 South Dearborn Street, Chicago

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Chicago

JOHN CLYDE OSWALD, Vice-Pres.
New York

E. E. HAIGHT, Sec'y-Treas.
Chicago



Maxwell "25"

The biggest automobile value ever offered for less than \$1,000.
Our production of 60,000 cars makes the new price of
\$695 fully equipped (with 17 new features) possible.

- 1—Pure stream-line body.
- 2—Adjustable front seat.
- 3—Sims high-tension magneto.
- 4—Three-quarter elliptic rear springs.
- 5—Tire brackets on rear.
- 6—Spring tension fan.
- 7—Kingston carburetor.
- 8—Clear Vision Wind Shield.
- 9—Foot-rest for accelerator pedal.
- 10—Concealed door hinges.
- 11—Gasoline tank located under dash cowl.
- 12—Crown fenders with all rivets concealed.

- 13—Head lights braced by rod running between lamps.
- 14—Famous make of anti-skid tires on rear.
- 15—Gracefully rounded, double-shell radiator equipped with shock absorbing device.
- 16—Instrument board, carrying speedometer, carburetor adjustment and gasoline filler.
- 17—Improved steering gear; spark and throttle control on quadrant under steering wheel; electric horn with button mounted on end of quadrant.

Automobile experts have refused to believe that anyone could produce a full grown five passenger really beautiful fully equipped car—a car with real high tension magneto—a car with sliding gear transmission—left hand drive center control, a car with practically every high priced car feature for less than \$1,000.

Here it is. Here is a real automobile. Here is the easiest car to drive in the world—here is the greatest all around hill climbing car in the world. Here is an automobile to be really proud of.

Holds the Road at 50 Miles an Hour.

See this "Wonder Car" at the Maxwell dealer nearest you. Write at once for the beautiful 1915 Maxwell Catalog.

Dept. E.

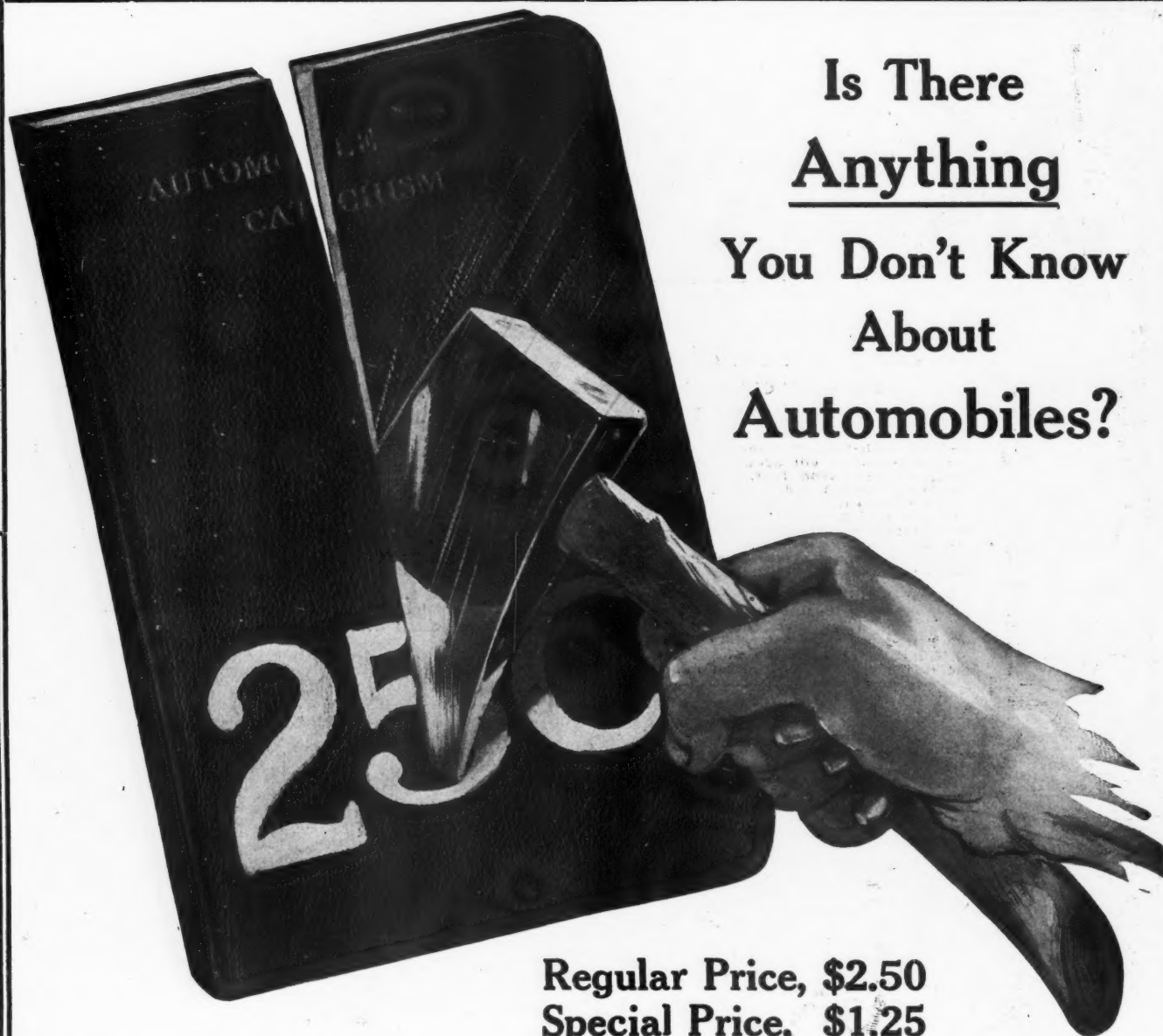
MAXWELL MOTOR CO., INC., DETROIT, MICH.



\$695

With Electric Self Starter and Electric Lights \$55 Extra

When Writing to Advertisers, Please Mention Motor Age.



Is There
Anything
You Don't Know
About
Automobiles?

Regular Price, \$2.50
Special Price, \$1.25

THE AUTOMOBILE CATECHISM" (de luxe edition) is a complete course in automobile instruction—every subject discussed and illustrated so that YOU will grasp every point worth while—every bit of mystery is made as simple as A B C. You are interested—you are instructed—you are directly benefited. Its information is final.

It's a handsome piece of book work—splendidly printed, with 101 illustrations; flexible black leather binding, rounded corners and gold-edged pages—beautiful, while being intensely practical.

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Enclosed please find \$1.25,
for which send me a copy of
"The Automobile Catechism"
(de luxe edition).

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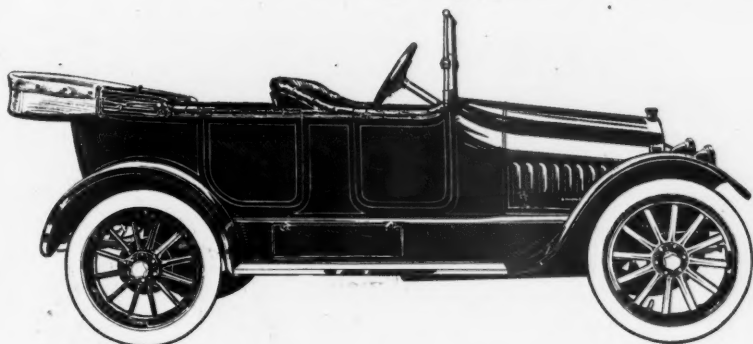
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(2)

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Have you ever seen such a Big, Powerful and Well-equipped Four for \$1100?



In comparison with other Fours at a moderate price, the \$1100 Herff-Brooks Four stands out.

The Herff-Brooks is larger, more powerful, better equipped. It is a better car. At \$1100 there is no Four which can begin to match it.

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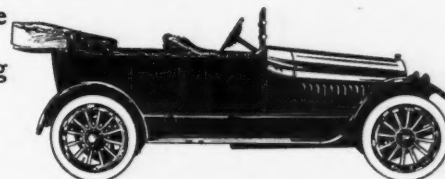
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Electric Lighting and Starting
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40 Horsepower
Demountable Rims, Extra Rim
Bosch High Tension Magneto DU System
Headlight Dimmers
One Man Top
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Complete Equipment
Timken and New Departure Bearings

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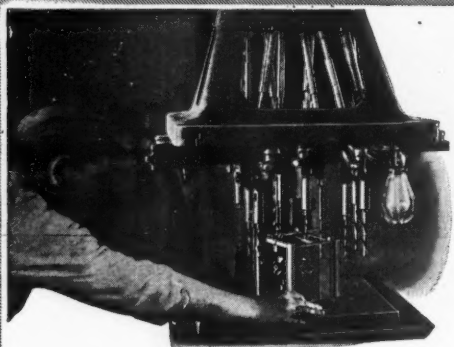
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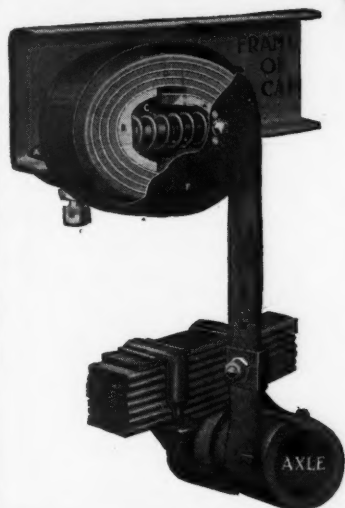
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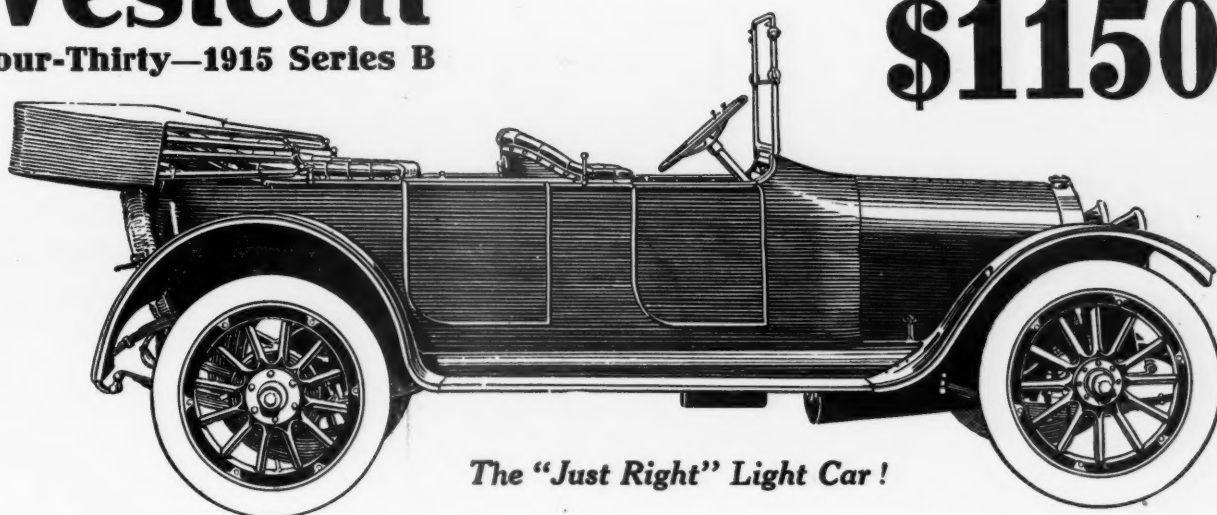
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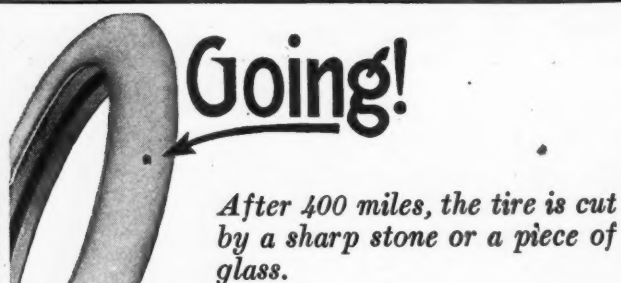
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You can repair any puncture, blow-out, tear or hole in a few minutes with a Shaler Vulcanizer and make the repair the strongest part of the tire.

Remember that your old tire might just as well have run 10,000 miles. The new one will run 10,000 miles if you vulcanize it with a Shaler.

Prevent Blow-Outs and Save Repair Bills

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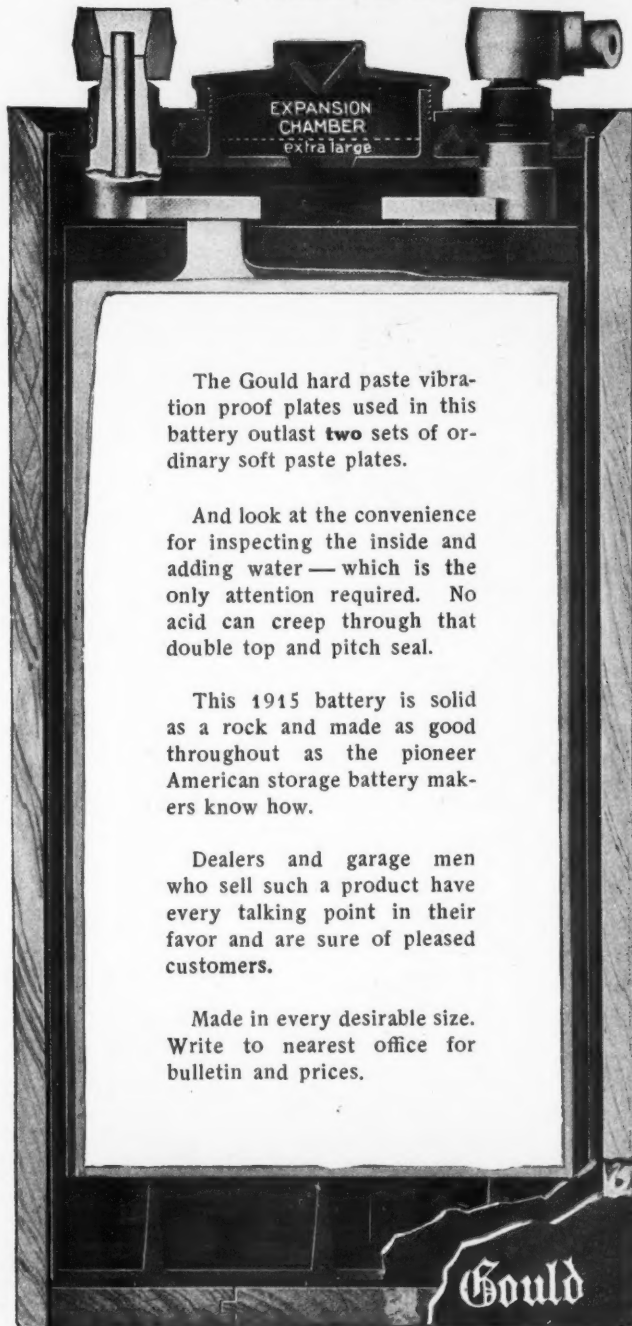
Every motorist needs it, because it tells what to do for every kind of tire trouble and gives valuable hints about the care of tires. Catalogue gives full information about our complete line of vulcanizers—Electric—Gasoline—Alcohol and Steam for every requirement of the motorist's use at home and public garage service.

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 The Largest Manufacturers of Vulcanizers in the World

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 a lighting and
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This 1915 battery is solid as a rock and made as good throughout as the pioneer American storage battery makers know how.

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Business Keeps Coming



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COCHRAN SPEEDNUT WRENCH

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It Ratchets on the Nut

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Department W

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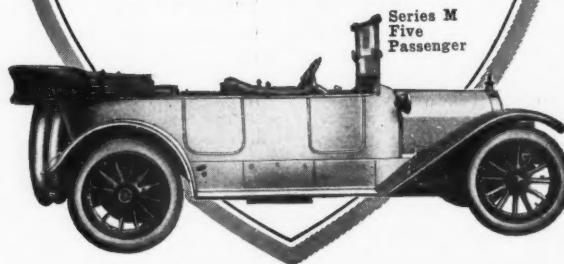
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Steamers arrive and depart from Third Avenue Wharf, Detroit.

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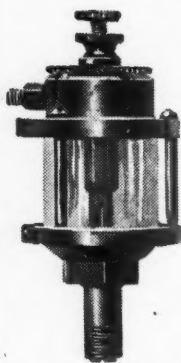
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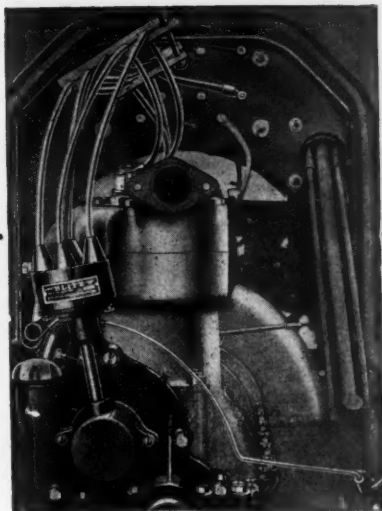
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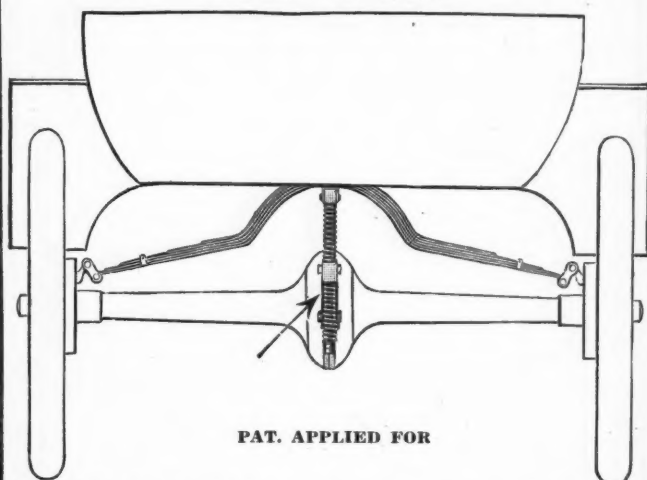
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This device checks the ordinary road shocks and regulates the rebound action of the springs.

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Their serviceability, accuracy, and durability is vastly superior to that of any other small instrument and, in fact, their merits are so radical as to place them in a class which is distinctly their own. We should be glad to prove these statements upon request.

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Is your tire
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Do you wonder why so
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Are your repair bills high?

Do you know what your gross cost per mile is?

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THE AUTOMOBILE EXPENSE RECORD

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Keep a record of expense of every trip, in space reserved for this purpose.

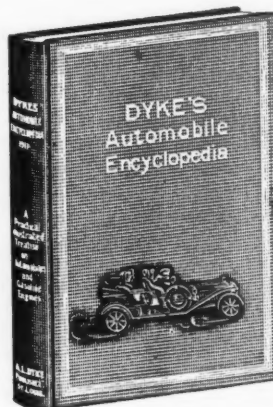
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Add the pleasures and comforts of easy riding to the dependability of your Ford car. Don't let "car fatigue" caused by rough roads spoil a day's motoring enjoyment. Equip your Ford car with—

BUCKEYE DE LUXE SHOCK ABSORBERS

They knock the shock—give perfect results on any road, under any load. Constructed of best materials obtainable, including drop forgings, Bronze Rocker plates and Bronze bushings. Unlike other shock absorbers, they never sway when taking sharp curves. However rough the road, the downward motion on their spiral springs is always at right angles. Can be attached in one hour by any Ford owner.

Price, per set of 4, \$15.00. Per set of 2, \$8.00. In ordering specify whether for Touring Car or Roadster.

Order through your dealer or sent direct prepaid on receipt of remittance. Absolutely guaranteed.

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MANUFACTURED BY

THE CENTRAL BRASS & FIXTURE CO., Springfield, Ohio



Takes the Jar Out of the Ford Car



SHIFT THIS LEVER FORGET THE WEATHER

The adjustment for varying speed and load is formed in the air and needle-valves of a

Motsinger's
Carburetor increased mileage guaranteed

They are cut from solid metal, and cannot change or vary. Temperature changes the adjustment of all carburetors. This **ONE** and **ONLY** adjustment for temperature on the steering-post enables the driver to keep a perfectly adjusted carburetor from January to September, without a change of needles, nozzles, or air-valves. Temperature is the foe of economy.

You are not interested in the economy obtained by experts on a three adjustment carburetor. Send for letters from our customers showing what you, **YOURSELF**, can get on your car.

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When You See
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Think of

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The Imprint of Safety

If all "Non-Skid" or "Anti-Skid" tires were like Firestones—the *Real and Original*—there would be no need for the objectionable and expensive chains. Try Firestones and you will Trust Firestones.

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FRICION REDUCING MOTOR OIL

Maintains the correct lubricating
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The wheel that makes any car modern

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For George W. Houk Co. (Licensed Under Rudge-Whitworth)

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Four floating bronze ball valves opening automatically under different motor suction supply a uniform mixture at any speed, regardless of hot, cold, wet or dry weather. Write for details and let us tell you why so many manufacturers are adopting this carburetor as standard equipment

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ESTABLISHED 1895

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96 Horse Power

80 Miles an Hour

Rated at 25 horse power—develops 96 horse power. Four cylinders, 4 inch bore and 8 13-16 inch stroke; 7 passenger; \$1,850, fully equipped.

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Inter-State

We have a money making proposition
for every live dealer in the country. It
will pay YOU to investigate it NOW.

Inter-State Motor Company
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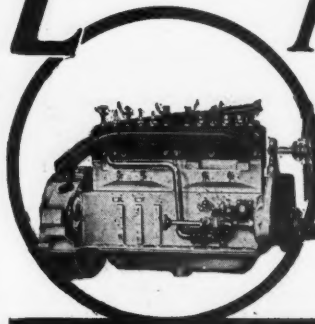
Master Vibrator For FORDS

Simple to install—Practically no adjustment—
Gives more power, flexibility and makes starting
easier. Price \$9.00.

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Motors



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Model U, 2 1/4 x 4 Model C, 4 1/4 x 5 1/4
Model N, 3 1/2 x 5 Model E, 4 1/2 x 5 1/4
Model N, 3 3/4 x 5 Model T, 5 x 5 1/4
Model C, 3 3/4 x 5 1/4 Model T, 5 1/4 x 5 1/4

SIXES
Model 6-N, 3 1/2 x 5
Model 6-P, 3 3/4 x 5 1/4 Model 6-C, 4 1/4 x 5 1/4

Continental Motor Mfg. Co.
Detroit, Michigan
Factory Representative, K. F. Peterson, 122 S. Michigan Ave., Chicago.



Touring Car.....\$490
Roadster 440
Town Car..... 690

For further particulars regarding these low prices and profit sharing plan see Ford Branch.

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Detroit, Michigan

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TWITCHELL AIR GAUGE

and save your tires



"TIRE INSURANCE FOR \$1.00"

Simple, Accurate, Durable and Easily Read
FOR SALE BY JOBBERS, DEALERS, GARAGES, OR

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See our
announcement
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August 27th
Issue



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LEECE - NEVILLE STARTING and LIGHTING SYSTEM

Because it keeps on the job and
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Ask them about this

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\$890

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PYRMA Aluminum Heel Plates

where heels rest when feet are on pedals. Simply bend corners down, place on mat, mark position, and with your jack knife cut slits in mat, insert corners and bend to clinch. Attached in five minutes and will last forever. Sold by Ford dealers or mailed direct on receipt of price.

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AUTOMOBILE MATTING CO.
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NO MORE SIDE-WALL BREAKS—RIM CUTS—
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DEALERS! Do you realize the unusual opportunity that comes with representation of the highest class electric built? Some territory still open. Our 4-page advertisement in this paper June 25th tells more. Read it, then write.

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*In Design 'Tis the Newest
Its Parts Are the Fewest*

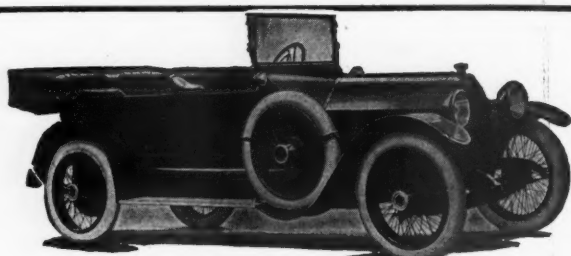
LARGE PRODUCTION IN DETROIT

Now Every Motorist Can Have

A MASTER

QUICK ACTION

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MASTER CARBURETER CORPORATION
944 Woodward Ave., Detroit



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Continental 6 P motor, 48 H. P. Bosch Ignition. Brown-Lipe 4 speed forward transmission. Spicer Universal joints. Timken full floating rear axle. Timken front axle with Empico speedometer drive. Timken bearings throughout. Long radiator. One man top. Gemmer steering gear. Left drive, center control. Goodyear tires, 34 x 4 1/2. Electric starting, generating and lighting. 180-inch wheelbase. 3,600 lbs.

Two pass., \$2485; Five pass., \$2485; Seven pass., \$2535
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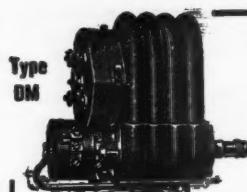
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Comfort and Safety

Two features demanded in an automobile and two features depending largely on springs. Insist upon Detroit Springs—the springs guaranteed for two years—the springs tested before they leave the factory for permanent resilience, hardness, flexibility, capacity and emergency shocks.

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The performance of **HEINZE IGNITION APPARATUS** for the past ten years justifies our claim that our product is superior in both points of construction and efficiency.

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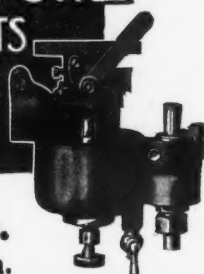
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CARBURETOR

NO MOVING PARTS
ONLY ONE ADJUSTMENT

WRITE FOR
PARTICULARS



Holley Brothers Co.
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Guaranteed for 10,000 Miles Bricton Pneumatic Tires

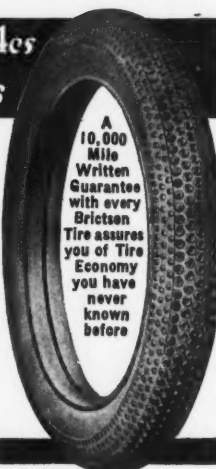
We now sell Bricton Pneumatic Tires on a specific guarantee of 10,000 miles service. Bricton Pneumatic Tires are Puncture-proof, Blowout-proof, Skid-proof, Rut-proof, Rim cut-proof, Oil-proof and Gasoline-proof. A tire with wonderful resiliency and easy riding qualities.

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If you are not in need of new tires and the fabric in your tires is still good, we can rebuild them the Bricton Way, give you thousands of miles additional service and make them Puncture-proof, Blowout-proof, Skid-proof, Rut-proof, Rim cut-proof, Oil-proof and Gasoline-proof.

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10,000
Mile
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Guarantee
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Bricton
Tire assures
you of Tire
Economy
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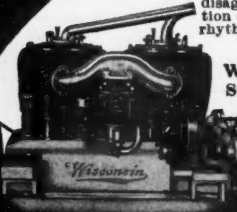
After all it is the motor that keeps on going that makes automobiles and motor trucks a success. Wisconsin Motors, both the auto type and the truck type, have proven that they are

ABSOLUTELY CONSISTENT

You can always rely upon them. You can always be sure that you will keep on going. When you hear one running—and they operate so quietly that it's hard to hear them—you never hear that disagreeable "thump" which accompanies the operation of so many motors—you hear nothing but the rhythmic purr of a perfectly constructed motor.

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GAS, OIL, AND ELECTRIC

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Each of these Kissel-Kar types is a "top notcher" in its class—unusual in comfort, elegance and service—in every detail the equal of cars sold at much higher prices.

The Car of Unusual Comfort

Extra liberal wheel base, big wheels and tires, roomy tonneau with luxurious upholstery—deep-pitched seats—powerful, flexible motor—full equipment. Write for beautifully illustrated catalog.

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ADJUSTABLE TO ANY LOAD

the shock absorbers that have made good on heavy and light cars alike. The adjustment feature found only on Coxajustos is the reason for their superiority. A simple twist of the wrist adjusts them to the load. There is a model especially for the Ford.

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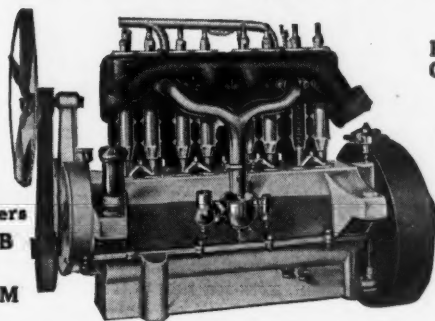
Brennan Standard High Grade Motors

Large Bearings
Long Stroke
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MODEL B
4½x5

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High Grade 4 Cycle Motors

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6-60 Sparking Battery.....	5	7¾	9¾	\$7.49
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We Guarantee the Quality
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IT WILL PAY YOU TO WATCH OUR ADS.

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1031 DIME BANK BUILDING

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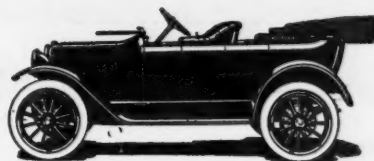
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The most powerful Automobile Signal ever known in the world. To be screwed in place of a compression cup. No signal has ever been more in demand.

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Five Passenger Touring Car



32 H. P. Long Stroke Motor

Enclosed Valves, Three Point Suspension, Unit Power Plant, Platform Rear Springs, Full Floating Rear Axle, Left Hand Drive, Center Control, Drop Frame, Large Tires, Complete Ball Bearing Car.

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Electric Auto-Lite Starting—Lighting—Ignition

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Universally Accepted as the Most Dependable Flexible
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Oil-Tight PARTS **INTERCHANGEABLE** **Dust-Proof**
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RADIAL RETAINERS

The Star Ball Retainer Co.
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**Manufacturers of Radial Ball Retainers, Thrust
Ball Retainers, Complete Thrust Bearings**

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NON-FLUID OIL
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BEST
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Where the pressure on axles and bearings is greatest—as with heavy pleasure cars and loaded trucks—the superiority of NON-FLUID OIL is best demonstrated. This effective lubricant provides a permanent, pressure-resisting cushion between all moving parts, thereby reducing friction to a minimum and insuring the smoothest running with least loss of power and with least wear.

"K-000 Grade" for compression cups and all bearings.
"K-00 SPECIAL Grade" for sliding gear transmission.
Sold by leading dealers everywhere

**New York & New Jersey
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165 Broadway, New York
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Safety and service—the two most important tire requirements—find their highest development in

PENNSYLVANIA Oilproof VACUUM CUP TIRES

Oilproof—Skid-Safe—Guaranteed for 4,500 Miles

Pennsylvania Rubber Co.
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An Independent Company With an Independent Selling Policy



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TIRE PUMPS

Are easy to use and easy to sell. They are durable and efficient and are widely advertised. The cylinders are of seamless brass tubing which cannot rust. The "Stapley," the "Aeolus," "Windjammer," etc., give lasting satisfaction. Carry them in stock.

Bridgeport Brass Company
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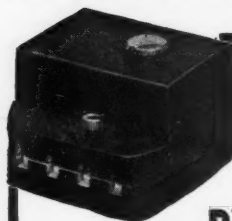
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The Heart and Brains
of an electric lighting and starting system. The

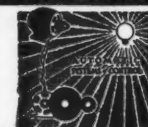
WARD LEONARD AUTOMATIC DYNAMO CONTROLLER

Dynamos controlled by the famous Ward Leonard Controller are in a class by themselves.

Regardless of the make of your system you can increase its efficiency as a lighting and starting system by using the Ward Leonard Controller.

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DOUBLE IGNITION

“Double Ignition” means igniting the mixture by two plugs at once. It produces much stronger explosions and cleaner pistons, even with heavy gasoline. It wonderfully increases

Power, Mileage, Hill Climbing Ability

SU-DIG Series Plugs permit Double Ignition with no other change in the ignition system. They fit any engine taking two plugs per cylinder (tap the valve caps if necessary).

Sold by live dealers and direct. WRITE TODAY for full information.

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\$3.85

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A Guaranteed Electric Signal
Unconditionally guaranteed for the life of any car.

Dealers: REXO II is the best to buy—easiest to sell. Write for unique co-operative sales proposition.

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THINK THOUSANDS OF MILES AHEAD, AND YOU WILL BUY REPUBLIC MILEAGE
PLAIN AND STAGGARD TREAD
TIRES

THE REPUBLIC RUBBER CO.
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BRANCHES AND AGENCIES IN THE PRINCIPAL CITIES.



Braender Tires & Tubes

SERVICE and SATISFACTION

The Only set of Tires to complete the entire 500-mile race at Indianapolis, May 30, 1913. Consider that 88 Tires of other makes were changed in this Race. Our “Victory Folder” explains other races.

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Established Agents Solicited

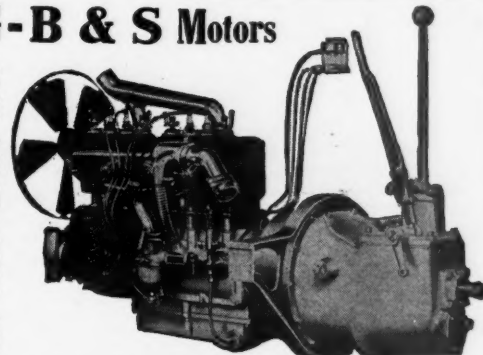
Motors G-B & S Motors

We beg to announce our latest four cylinder Unit Power Plant.

This Motor includes the recognized engineering practice, here and abroad.

“Craftsmanship of long experience is the result of this distinctive Power Plant.”

Detailed information on request, and we are in a position to make prompt deliveries according to contract.



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Model “36” \$1275.00

A car whose design and construction is so far ahead of others at its price that it is in a class all its own.

Gray and Davis Electric starting and lighting equipment, silent chain cam shaft drive, four inch by five inch motor, cork insert multiple disc clutch, 116 inch wheel base, left side drive, center control, and equipment complete to the last detail.

Model “25” \$975.00
Including Electric Starting and Lighting System

This model has made the Paige reputation. Such a sturdy, powerful, comfortable car has never been offered the public at anywhere near its price. \$975.00 with complete equipment.

Splendid Agency Proposition

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The Atwater Kent Ignition System



For 1915 more than sixty manufacturers of cars and motors will equip with Atwater Kent ignition, send for particulars.

Write today for booklet A.

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Steel Protectors



Each section 2 in. wide, 1/8 in. thick. They hook to rim. As flexible as ever. Anti-Skid, Can't Blow Out or Rim Cut.

HOW CAN THE RUBBER WEAR OFF IF IT IS COVERED WITH STEEL?

Try 2 or 3 sections over any old blowout

Special prices to the first in new territory

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Tire covered complete

\$2400
Completely Equipped

MOLINE KNIGHT

Four-cylinder,
five-passenger,
50 horsepower,
128-in. wheelbase.

Bosch ignition,
Wagner electric
starting and light-
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More Power
More Flexibility
More Economy
More Silence

The car of the future will not have poppet valves
Moline Automobile Co., East Moline, Ill.

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One Unit

Not pieced together in any sense is the Winton Six. Its entire construction satisfies the test of the fine and the industrial arts—the test of unity. Free from broken and meaningless lines, from crude curves and glaring angles, free from gingerbread and fillgree that quickly grow tiresome, the coach structure of the Winton Six is a fitting capsheaf to this car's pronounced mechanical merit. Send for 64 page catalog.

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World's First Maker of Sixes Exclusively

Only One Tire

THE DAYTON AIRLESS

is at all suitable for use on motor cars.

In War Times
When the car must be ready at all times—ready to go over any surface without failure—at unlimited speeds without injury to the car—without puncture or blowout—and ready to keep on going—then use Dayton Airless Tires. War time has no place for the stock excuse that the tire was not properly inflated or there was a stone bruise or that there was some unusual service.

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Tire service conditions are the same. If you require sure service—if your car must always be ready for action—if you want sure service with economy use Dayton Airless Tires.

Write for information.

THE DAYTON RUBBER MANUFACTURING COMPANY
Dayton, Ohio

We will send you the address of our nearest branch or dealer.

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AXLES WHEELS PROPELLERS

Salisbury Wheel & Mfg. Co.
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"32" Touring Car, fully equipped.....	\$1050
"32" Roadster, fully equipped.....	\$1050
"32" Touring Car or Roadster with Westinghouse two-unit electric generator and starter; electric lights; over-size tires 33x4 inches; demountable rims, extra tire carrier at rear	\$1200
Coupe.....	\$1350
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HUPP MOTOR CAR COMPANY
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METZ "Twenty-Two" Roadster

WINNER OF THE GLIDDEN TOUR

\$495

Equipped Complete

Gearless Transmission

Fore-door body, extra thick tufted upholstery, plate glass rain-vision wind shield, left-hand drive with center control, 4-cylinder, 23½ H.P. water-cooled motor, Bosch magneto, Prest-O-Lite tank, extension top, full elliptic springs, artillery wheels, best quality Goodrich clincher tires, 5 lamps, horn, pump, jack, tools. Speed, 50 miles per hour. Beats 'em all at climbing hills. Secure EXCLUSIVE SALE in your territory. Write for terms and Catalog "K."

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TOURING CAR

\$850

The Vulcan 27

"The World's Greatest Light Car"

SPEEDSTER \$750

1914 is to be the year of the Light Car—the low upkeep car—the VULCAN

Send for catalog and generous dealers' proposition.
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MANUFACTURED SINCE 1901 FOR HIGH GRADE AUTOMOBILES AND TRUCKS

3½x5¼ four and six cyl.
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Standard or Unit and

4x4 and 4½x5¼ standard types, all L head, 4 cycle.

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The Clearing House

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American Tourist demonstrator. White with black stripe and border. Electric lights and generator, but no starter. Equipped with Firestone non-skid casings and two extra casings and rims. All tires new. Price \$1,200 f. o. b. Lincoln, Neb.

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ONE FIVE-PASSENGER COLE AT A BARGAIN

This car is in first-class shape. All makes of automobiles for sale at prices that will surprise you. Autos for hire at reasonable rates. Phone Randolph 6117; nights and Sundays call Madison 2483.

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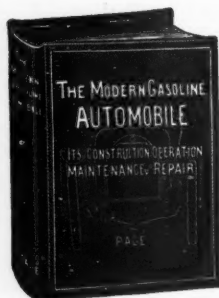
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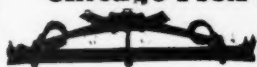
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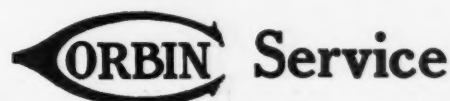
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The feature in the "2-38" which stands out most prominently in my opinion is economy. In the 1800 miles that I have covered, the average consumption of gasoline has been one gallon for every ten miles. The consumption of oil and other lubricants has been so infinitesimally small that it would be hard for me to give you the exact figure.

The tires with which the car was equipped, until last evening contained the same air as originally put in them when I drove the car home from Philadelphia. The wear and tear on the tires has been remarkably little, which clearly demonstrates the fact that the weight of the machine is so carefully and evenly distributed that the tires are appreciably conserved.

The starting system and the lighting system are giving me perfect satisfaction and maintain their efficiency absolutely.

Outside of the economical feature the one that most strongly appeals to me is the noiseless engine, smooth running and low throttling in crowded traffic. The changing of gears on the Packard "2-38" is reduced to a minimum. Once you are in the high speed notch you can ordinarily stay there from the beginning of your trip to the end.

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J. M. Leibert.

Bethlehem, Pa.
July 9th, 1914.

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1915 Model 80

